

PCG Pressure Case Gamma PCD Pressure Case Directional

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300	400	
Date run completed	28-Mar-14	29-Mar-14	03-Apr-14	07-Apr-14	
Rig Bit Number	2	3	4	5	
Bit Size (in)	8.750	8.750	6.125	6.125	
Tool Nominal OD (in)	6.750	6.750	4.750	4.750	
Log Start Depth (MD, ft)	635.00	5,865.00	6,914.00	12,561.00	
Log End Depth (MD, ft)	5,865.00	6,914.00	12,561.00	15,344.00	
Drill or Wipe	Drill	Drill	Drill	Drill	
Drill/Wipe Start Date and Time	27-Mar-14 20:15	28-Mar-14 20:30	30-Mar-14 18:45	04-Apr-14 12:15	
Drill/Wipe End Date and Time	28-Mar-14 10:45	29-Mar-14 10:30	02-Apr-14 08:45	06-Apr-14 16:15	
Min Inc (deg) @ Depth (MD, ft)	0.10 @ 4,392.00	0.89 @ 5,907.00	87.13 @ 6,946.00	88.27 @ 14,013.00	
Max Inc (deg) @ Depth (MD, ft)	9.04 @ 2,307.00	81.04 @ 6,859.00	91.20 @ 10,894.00	91.57 @ 14,487.00	
Bit TFA(in2) / Bit Type	1.24 / PDC	1.24 / PDC	1.24 / PDC	1.24 /	
Flow Rate (gpm)	600.00	577.42	277.50	270.00	
Max AV (fpm) / CV (fpm) @ MWD	417.2 / NA	398.7 / NA	401.4 / NA	401.4 / 400.0	
Fluid Type	Native/Spud Mud	Native/Spud Mud	Native/Spud Mud	Fresh Water Gel	
Density (ppg) / Viscosity (spqt)	9.65 / 38.00	10.30 / 42.00	10.20 / 34.00	11.10 / 38.00	
Filtrate CL (ppm)	1,800.00	1,800.00	1,500.00	1,400.00	
pH / Fluid Loss (mptm)	9.70 / 10	9.90 / 8	8.90 / 6	8.90 / 5	
PV (cP) / YP (lbf2)	9 / 13.00	13 / 14.00	11 / 15.00	15 / 8.00	
% Solids / % Sand	1.7 / 0.20	10.4 / 0.15	10.5 / 0.15	11.7 / 0.15	
% Oil / Oil:Water Ratio	N/A / N/A	NA / NA	NA / NA	N/A / N/A	
Rm @ Measured Temp (degF)	N/A @ N/A	NA @ NA	NA @ NA	N/A @ N/A	
Rmf @ Measured Temp (degF)	N/A @ N/A	NA @ NA	NA @ NA	N/A @ N/A	
Rmc @ Measured Temp (degF)	N/A @ N/A	NA @ NA	NA @ NA	N/A @ N/A	
Max Tool Temp (in F) / S	105.50 / RPM	100.00 / RPM	200.11 / RPM	210.00 / RPM	

Max Tool Temp (degF) / Source	165.58 / PCM	162.80 / PCM	223.41 / PCM	242.90 / PCM	
Rm @ Max Tool Temp (degF)	N/A @ N/A	NA @ NA	NA @ NA	N/A @ N/A	
Lead MWD Engineer	Brett Vandergon	Brett Vandergon	Brett Vandergon	Brett Vandergon	
Customer Representative	Matt Settles	Matt Settles	Matt Settles	Matt Settles	

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM	PCM	
Software Version	5.84	5.84	5.84	5.84	
Sub Serial Number	11341327	11341327	12361804	12361804	
Insert Serial Number	11619995	11619995	11619995	11227573	
Date and Time Initialized	26-Mar-14 17:51	01-Jan-70 00:00	29-Mar-14 19:53	02-Apr-14 22:28	
Date and Time Read	29-Mar-14 18:33	29-Mar-14 18:43	03-Apr-14 16:35	07-Apr-14 12:36	
ECMB SW Version	N/A	N/A	N/A	N/A	

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	57.00	55.00	66.00	66.00	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11341327	11341327	12361804	12361804	
Sonde Serial Number	11833228	11833228	11833228	11638605	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	307.94	55.92	230.40	345.60	

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	
Distance From Bit (ft)	49.69	47.57	58.61	58.53	
Recorded Sample Period (sec)	10	10	10	10	
Software Version	8.15	8.15	8.15	8.15	
Sub Serial Number	11341327	11341327	12361804	12361804	
Insert/Sonde Serial Number	11681019	11681019	11681019	11579834	

REMARKS

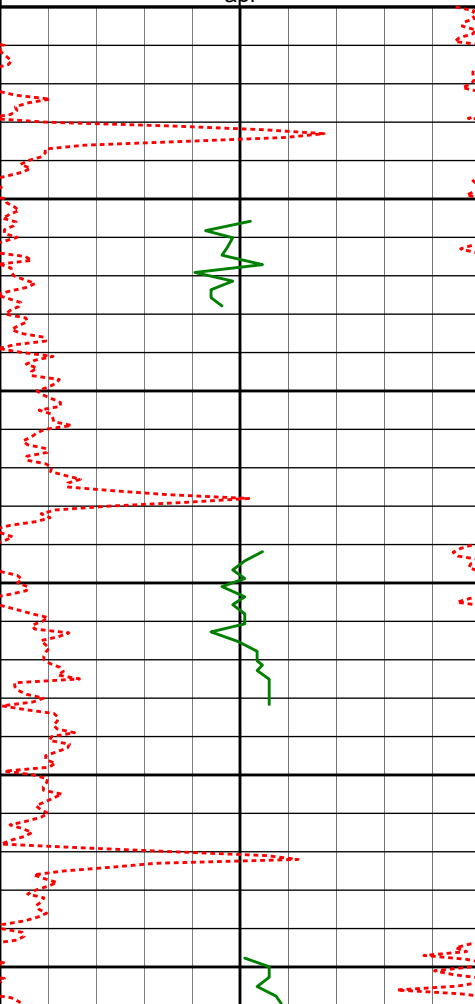
1. All depths are measured bit depths, referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annual velocities are calculated using the "Power Law" model for water based fluids and the "Bingham Plastic" model for oil and synthetic based fluids.
4. All data presented is recorded data unless otherwise specified.
5. The following smoothing parameters have been applied to the data:
PGRC (Corrected Gamma Ray):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft
Gap Fill: 3.0 ft
ROPA (Average Rate of Penetration)
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft
6. INSITE version 8.0

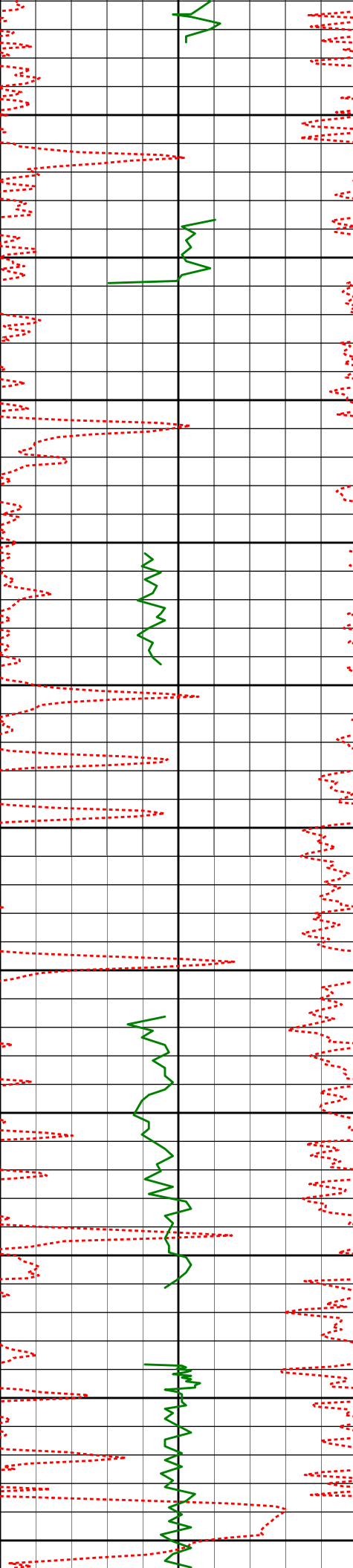
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HALLIBURTON

MD Main Log 1:600

Average Rate of Penetration ROPA						
1K0						
feet per hr						
Gamma CG Cor PGRC		Measured Depth (ft) 1:600	Depth	Inc	Azi.	TVDV.S.
0200						
api						
						
		3050'				
		3066'	0.31°	275.15°	3058.01'	93.47'
		3100'				
		3150'				
		3160'	0.22°	346.41°	3152.01'	93.76'
		3200'				
		3250'				
		3255'	0.33°	94.67°	3247.01'	93.52'



3300'

3350'

3400'

3450'

3500'

3550'

3600'

3650'

3700'

3750'

3800'

3350'

3444'

3539'

3634'

3728'

0.62°

0.47°

0.56°

0.88°

0.77°

286.56°

225.25°

193.62°

204.33°

204.37°

3342.01'

3436.01'

3531.00'

3626.00'

3719.99'

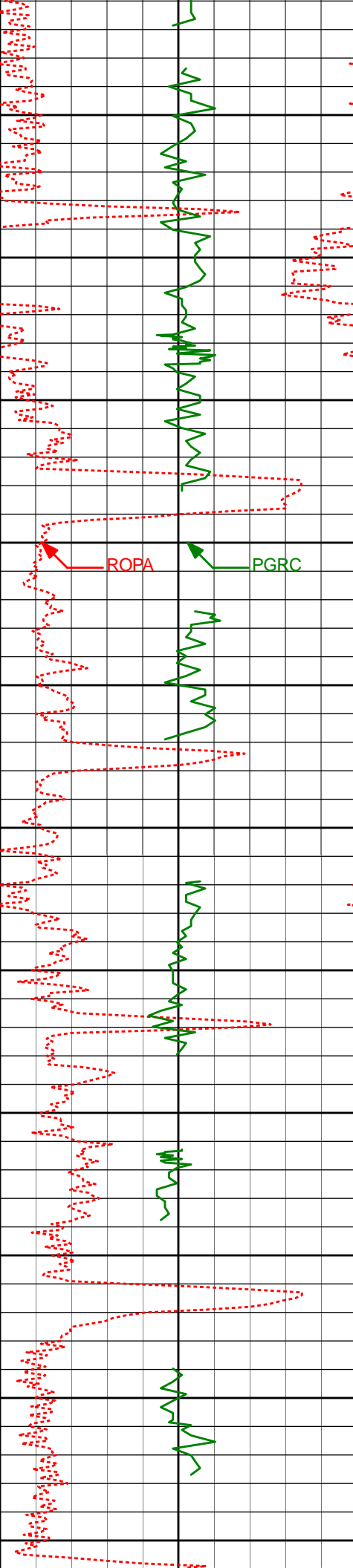
93.74'

94.50'

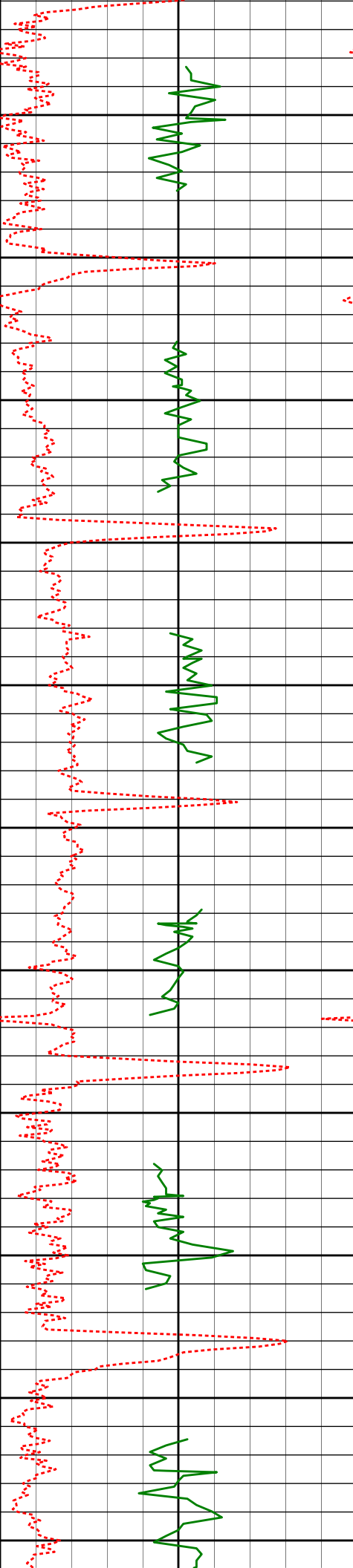
94.91'

95.35'

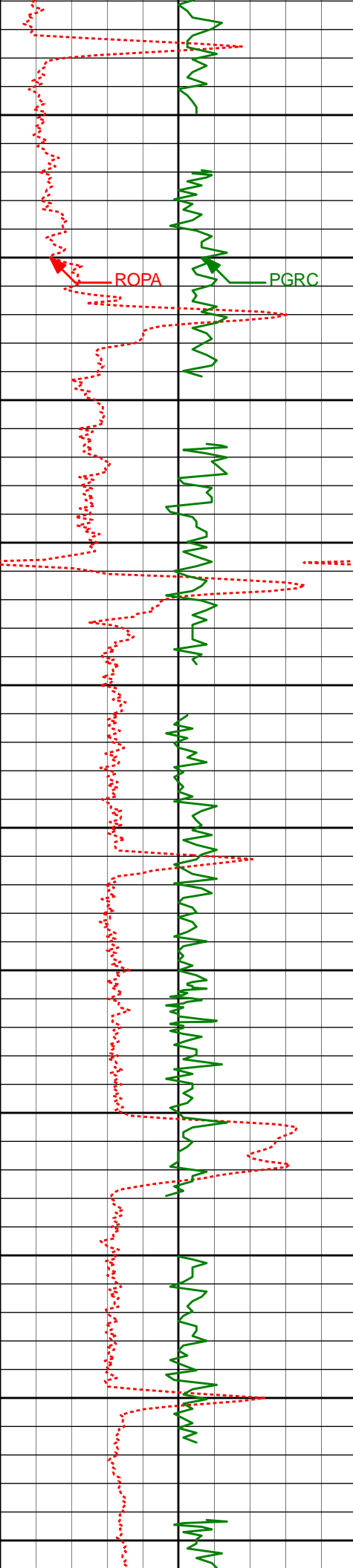
95.95'



3823'	0.62°	249.05°	3814.98'	96.71'
3918'	0.72°	235.47°	3909.97'	97.70'
4013'	0.23°	213.17°	4004.97'	98.31'
4108'	0.17°	36.01°	4099.97'	98.33'
4202'	0.13°	230.77°	4193.97'	98.33'
4297'	0.18°	179.46°	4288.97'	98.42'



4400'	4392'	0.10°	299.47°	4383.97'	98.50'
4450'					
4500'	4487'	0.28°	1.94°	4478.97'	98.55'
4550'					
4600'	4582'	0.37°	308.51°	4573.97'	98.77'
4650'					
4700'	4677'	0.63°	319.97°	4668.96'	99.33'
4750'					
4800'	4771'	0.52°	301.43°	4762.96'	100.01'
4850'					
4900'	4866'	0.18°	322.68°	4857.96'	100.46'



4950'

4961'

0.13°

324.35°

4952.96'

100.60'

5000'

5056'

0.39°

299.79°

5047.96'

100.94'

5100'

5151'

0.80°

243.36°

5142.95'

101.82'

5200'

5246'

0.80°

265.98°

5237.94'

103.08'

5300'

5340'

0.73°

303.58°

5331.93'

104.22'

5350'

5400'

5435'

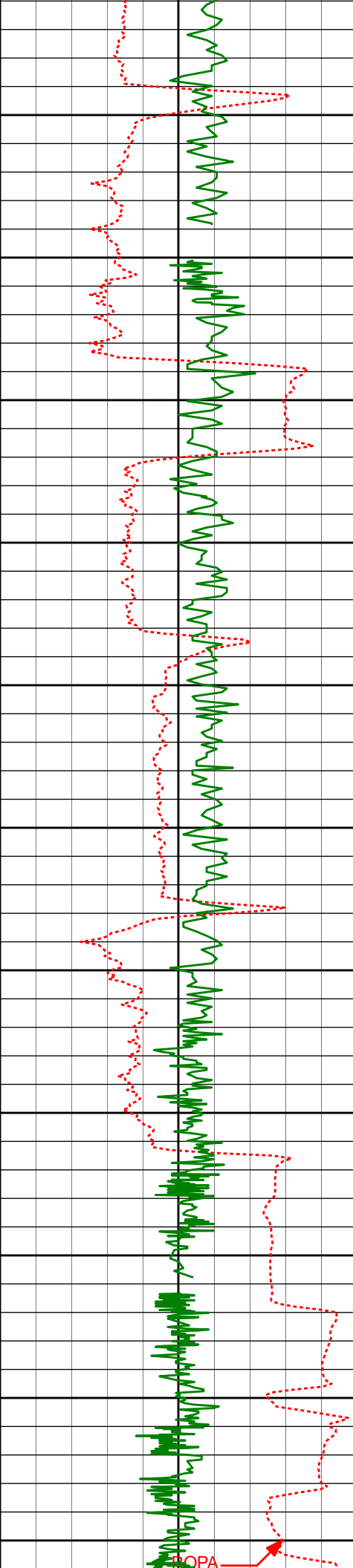
0.89°

265.43°

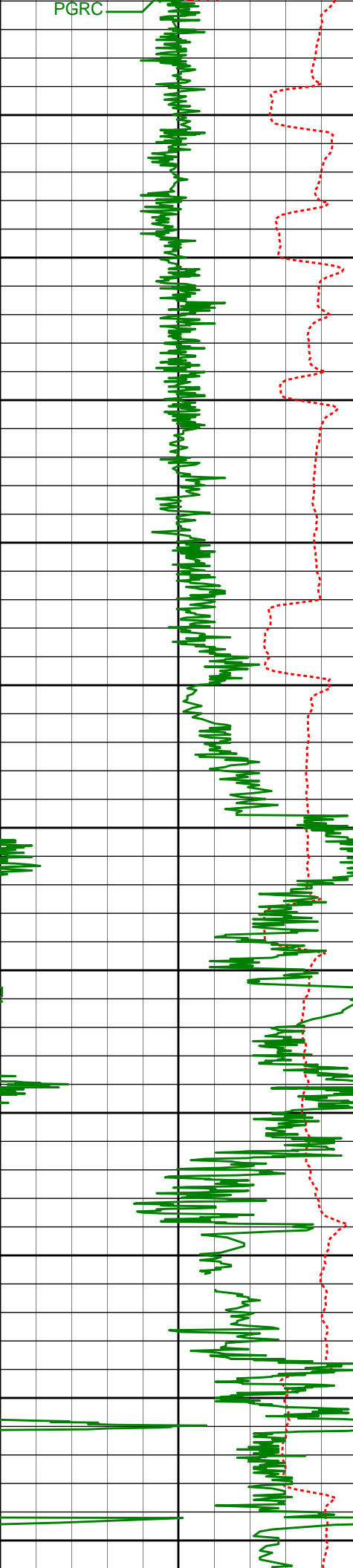
5426.92'

105.45'

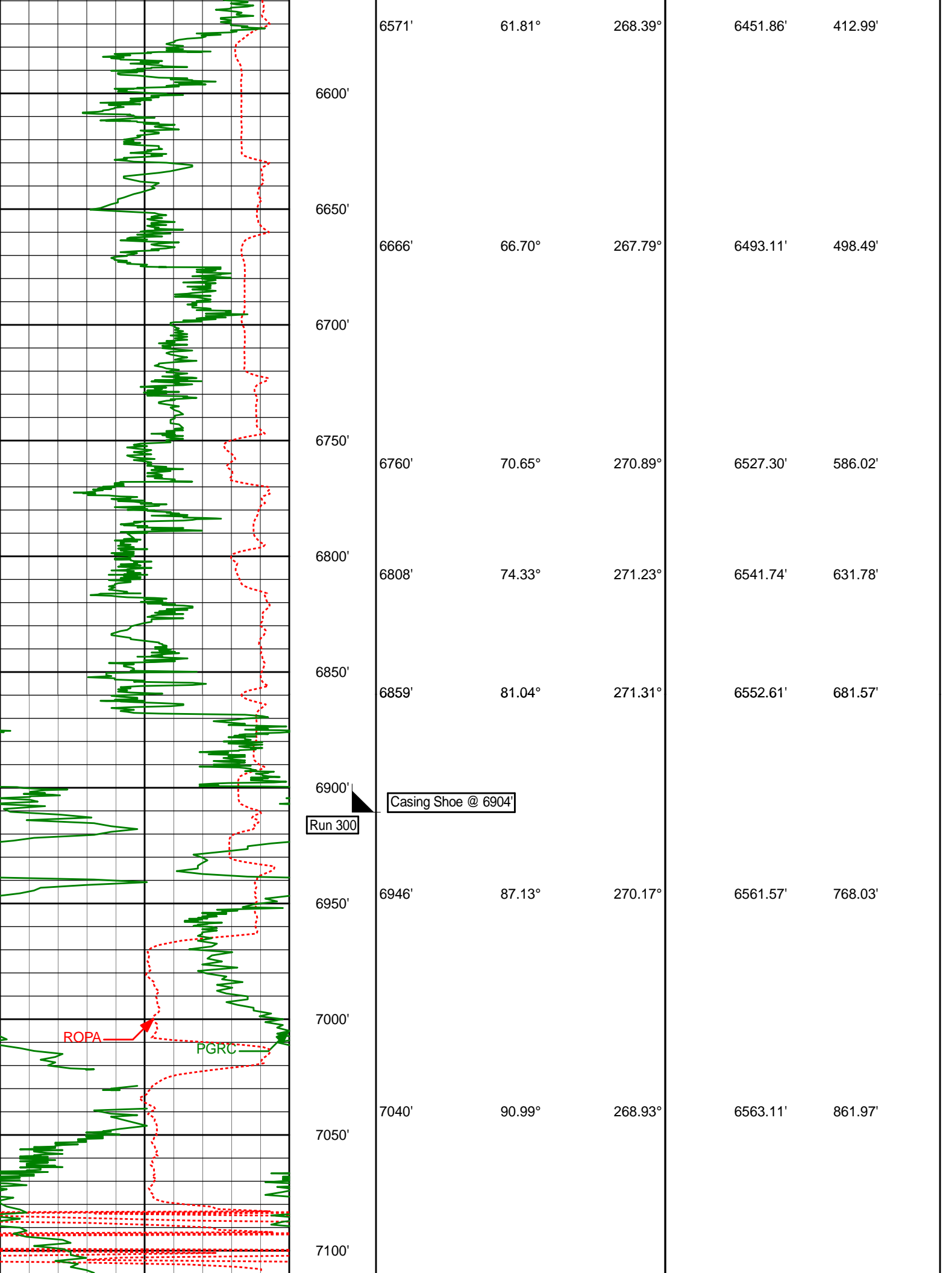
5450'

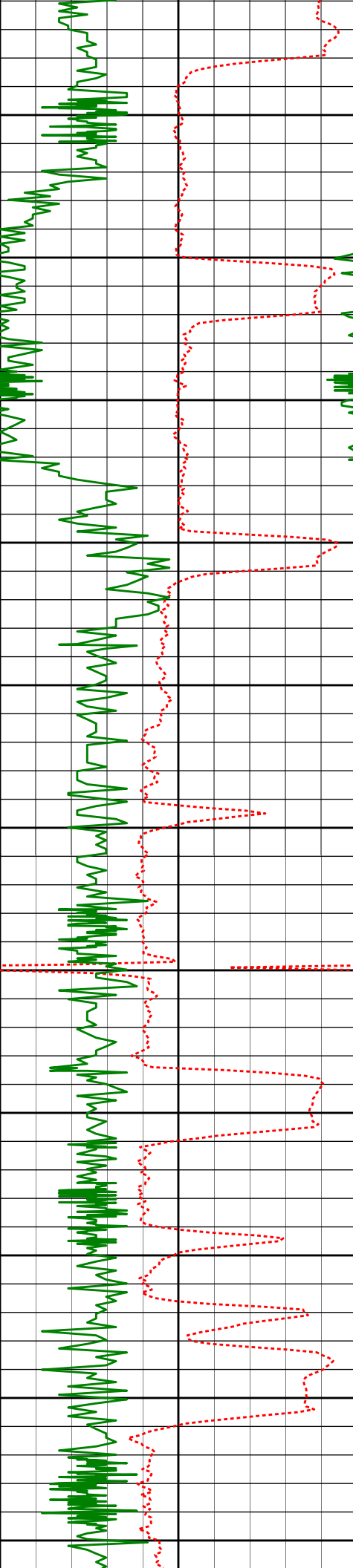


5500'				
5530'	0.81°	288.19°	5521.91'	106.82'
5550'				
5600'				
5650'				
5700'				
5719'	0.65°	278.74°	5710.90'	109.13'
5750'				
5800'				
5812'	0.86°	276.09°	5803.89'	110.34'
5850'				
<div>Run200</div>				
5900'				
5907'	0.89°	287.28°	5898.88'	111.75'
5950'				
5955'	3.88°	270.43°	5946.83'	113.72'
6000'				
6002'	7.18°	265.40°	5993.61'	118.25'



6050'	6050'	10.67°	260.48°	6041.02'	125.64'
6100'	6097'	13.82°	264.98°	6086.95'	135.55'
6150'					
6200'	6192'	22.83°	269.77°	6177.04'	165.37'
6250'					
6300'	6287'	30.17°	269.82°	6262.00'	207.72'
6350'					
6400'	6381'	40.49°	267.13°	6338.59'	261.99'
6450'					
6500'	6476'	55.14°	266.62°	6402.21'	332.12'
6550'					





7135'

7150'

7200'

7230'

7250'

7300'

7325'

7350'

7400'

7420'

7450'

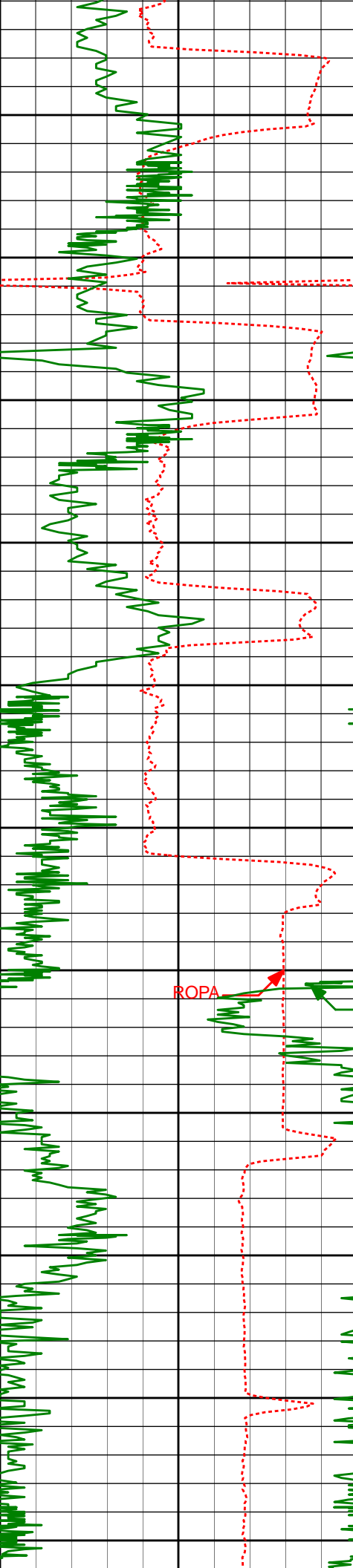
7500'

7550'

7600'

7650'

7135'	89.72°	268.24°	6562.52'	956.97'
7230'	90.09°	270.13°	6562.68'	1051.95'
7325'	88.77°	270.30°	6563.63'	1146.89'
7420'	89.72°	267.97°	6564.88'	1241.87'
7515'	89.23°	266.96°	6565.75'	1336.85'
7609'	89.32°	266.63°	6566.94'	1430.81'



7700'

7750'

7800'

7850'

7900'

7950'

8000'

8050'

8100'

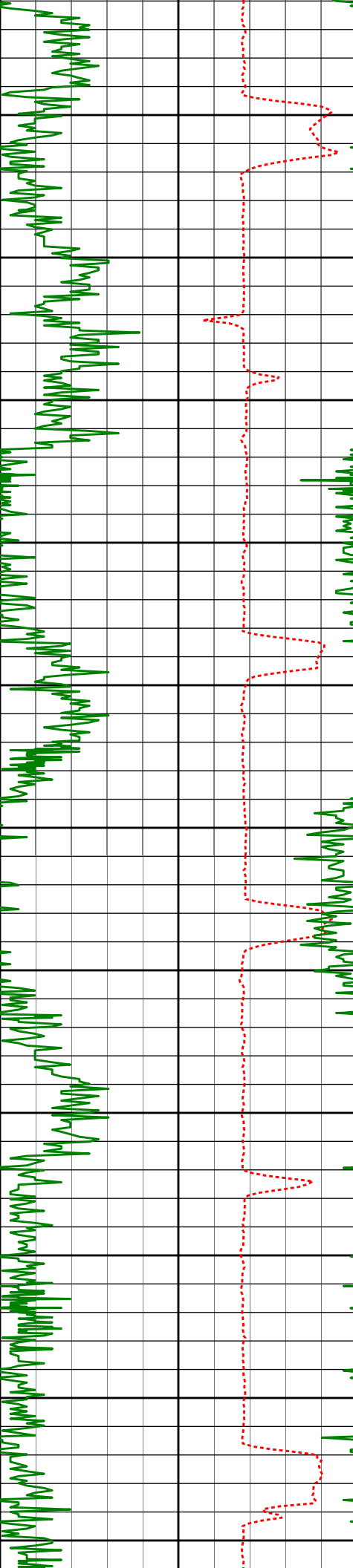
8150'

8200'

7704'	89.11°	266.76°	6568.24'	1525.76'
7799'	88.61°	268.46°	6570.13'	1620.73'
7894'	91.02°	269.73°	6570.44'	1715.72'
7989'	89.04°	272.80°	6570.39'	1810.58'
8083'	89.29°	270.45°	6571.76'	1904.40'
8178'	88.12°	268.80°	6573.90'	1999.35'

ROPA

PGRC



8250'

8272'

89.57°

269.94°

6575.80'

2093.31'

8300'

8350'

8367'

90.80°

269.94°

6575.49'

2188.26'

8400'

8450'

8462'

88.21°

268.57°

6576.31'

2283.24'

8500'

8550'

8556'

88.92°

269.00°

6578.67'

2377.20'

8600'

8650'

8651'

89.51°

268.42°

6579.97'

2472.19'

8700'

8750'

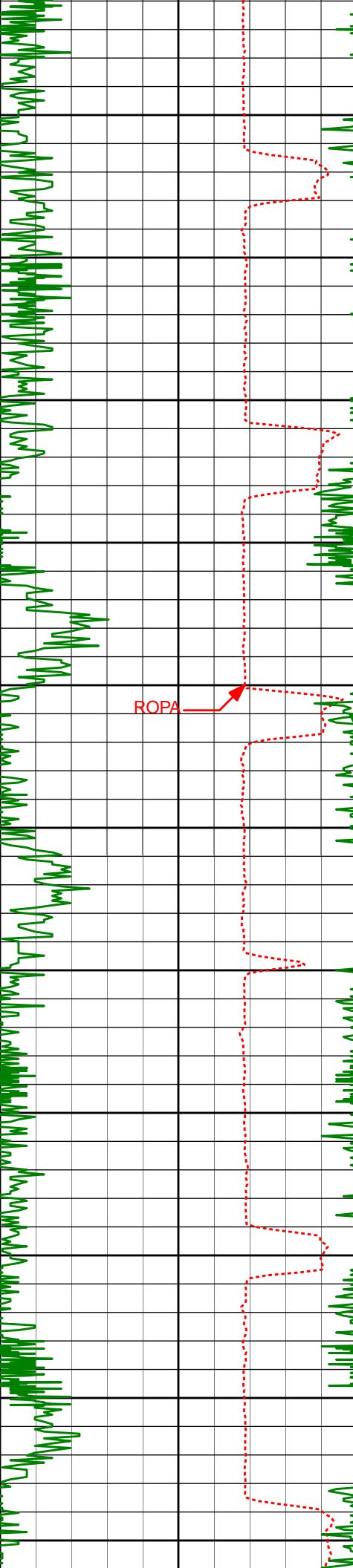
8746'

89.75°

268.72°

6580.58'

2567.19'



8800'

8850'

8900'

8950'

9000'

9050'

9100'

9150'

9200'

9250'

9300'

8841'

8935'

9030'

9125'

9220'

89.48°

90.74°

89.48°

89.63°

89.38°

267.98°

268.86°

269.18°

268.69°

266.69°

6581.22'

6581.04'

6580.86'

6581.59'

6582.42'

2662.19'

2756.18'

2851.17'

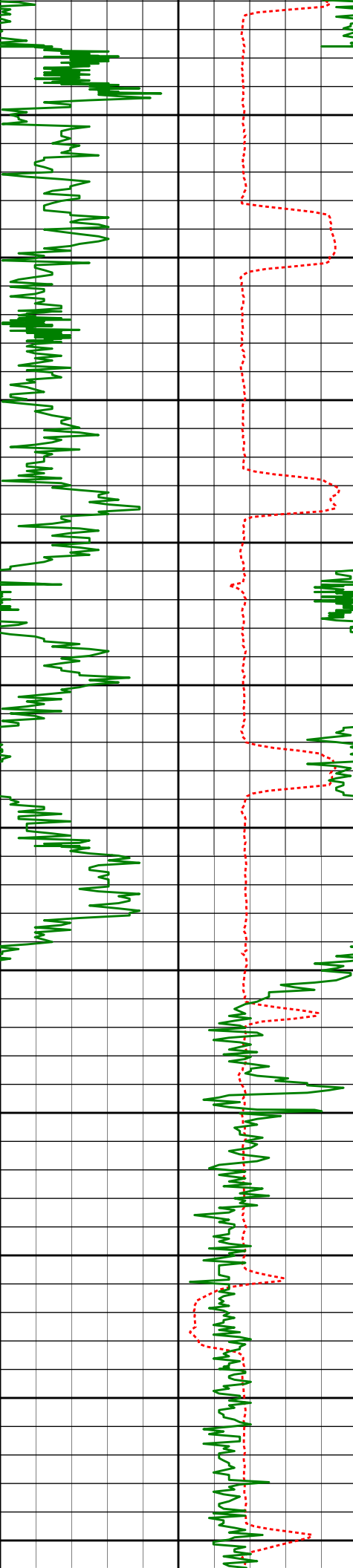
2946.17'

3041.15'

ROPA

PGRC





9350'

9400'

9450'

9500'

9550'

9600'

9650'

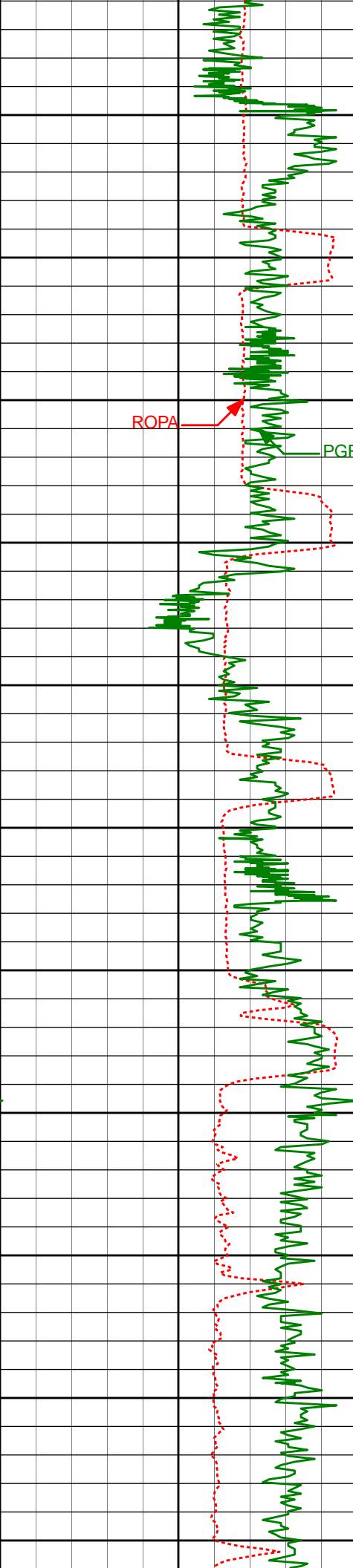
9700'

9750'

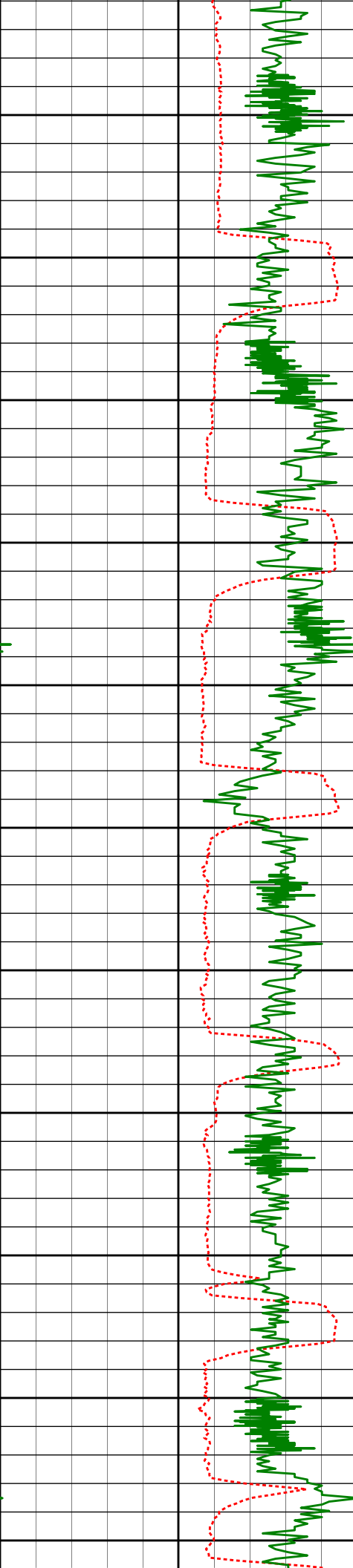
9800'

9850'

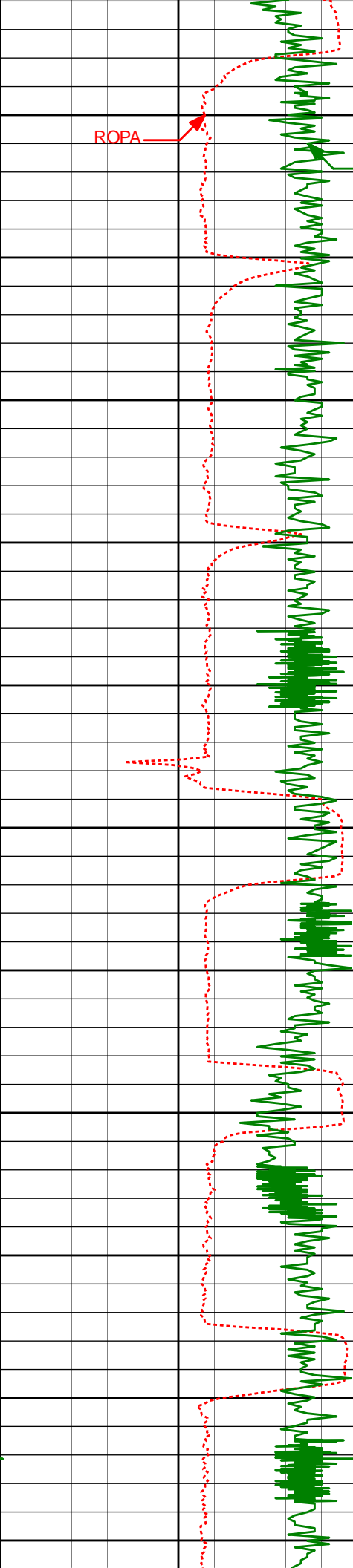
9315'	90.96°	268.45°	6582.13'	3136.14'
9410'	90.71°	270.39°	6580.75'	3231.10'
9505'	87.90°	269.30°	6581.90'	3326.05'
9596'	88.30°	270.13°	6584.92'	3416.97'
9688'	89.14°	269.66°	6586.97'	3508.91'
9781'	89.88°	269.36°	6587.77'	3601.89'



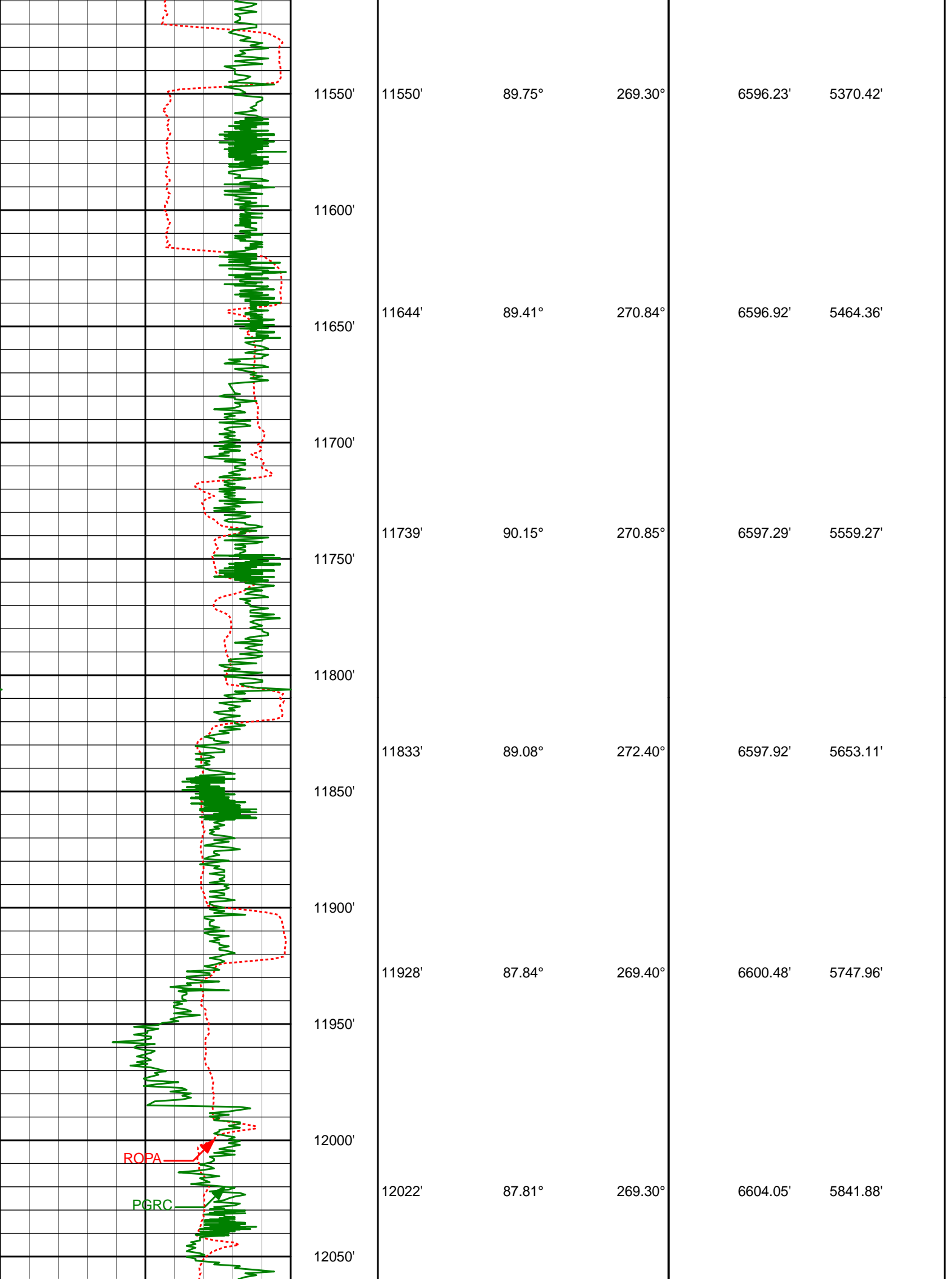
9873'	88.52°	267.20°	6589.05'	3693.87'
9900'				
9950'				
9966'	88.43°	268.41°	6591.53'	3786.83'
10000'				
10050'				
10059'	89.88°	268.67°	6592.90'	3879.82'
10100'				
10150'				
10151'	90.99°	269.44°	6592.20'	3971.81'
10200'				
10243'	89.91°	270.30°	6591.48'	4063.77'
10250'				
10300'				
10335'	89.41°	268.95°	6592.03'	4155.74'
10350'				
10400'				

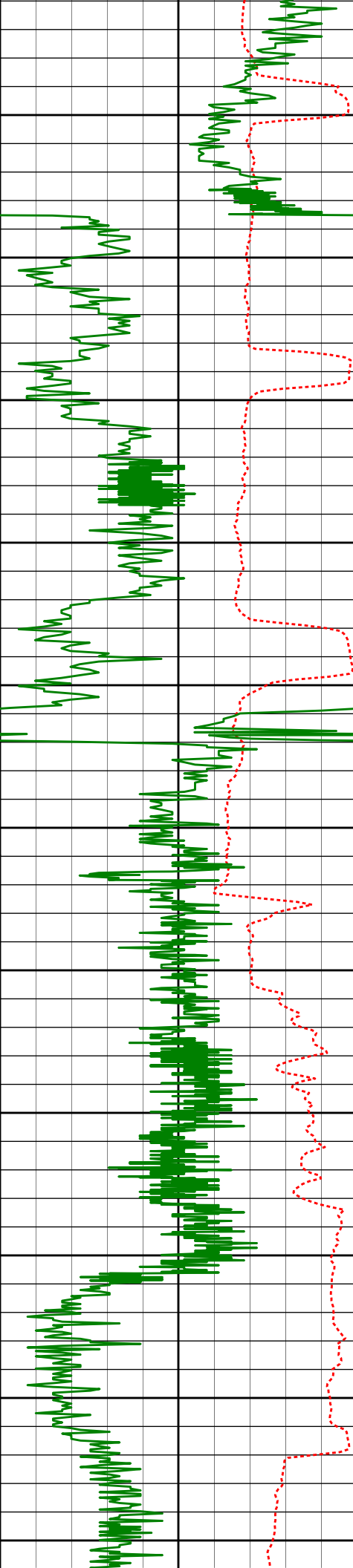


10428'	89.57°	266.81°	6592.85'	4248.73'
10450'				
10500'				
10521'	89.54°	267.38°	6593.58'	4341.70'
10550'				
10600'				
10614'	90.28°	268.65°	6593.72'	4434.70'
10650'				
10700'				
10708'	88.49°	269.14°	6594.73'	4528.68'
10750'				
10800'	10801'	90.37°	270.13°	6595.66'
10850'				
10900'	10893'	91.20°	270.89°	6594.40'
10950'				

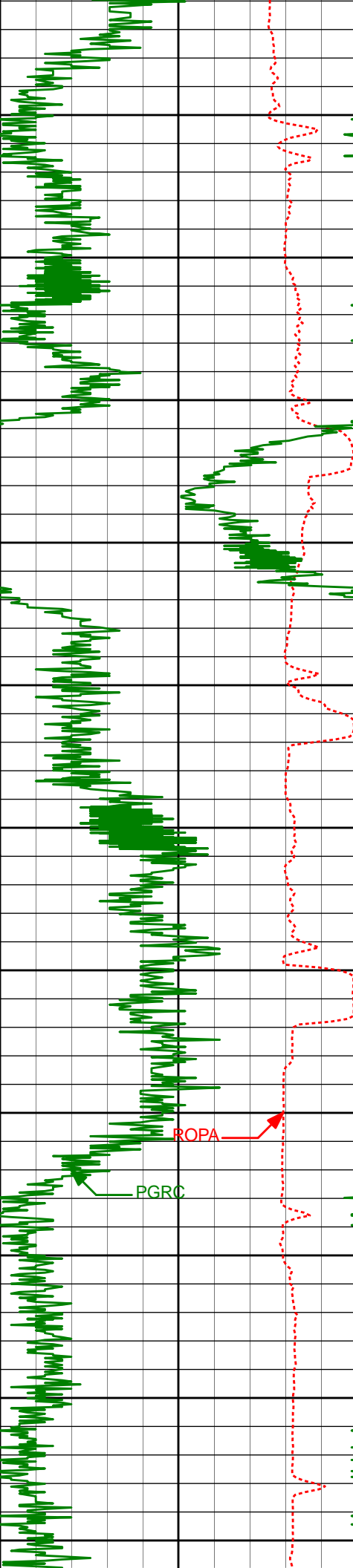


10986'	89.48°	270.70°	6593.84'	4806.48'
11000'				
11050'				
11078'	89.78°	268.52°	6594.43'	4898.45'
11100'				
11150'				
11172'	89.91°	266.89°	6594.68'	4992.44'
11200'				
11250'				
11267'	89.63°	267.84°	6595.07'	5087.43'
11300'				
11350'				
11361'	89.57°	268.49°	6595.72'	5181.42'
11400'				
11450'				
11455'	90.03°	268.54°	6596.05'	5275.42'
11500'				





12100'	12116'	88.40°	269.17°	6607.16'	5935.81'
12150'					
12200'	12211'	88.52°	267.62°	6609.71'	6030.78'
12250'					
12300'	12306'	90.52°	268.28°	6610.51'	6125.77'
12350'					
12400'	12401'	90.28°	268.31°	6609.84'	6220.76'
12450'					
12500'	12495'	90.03°	267.90°	6609.59'	6314.76'
12550'					
Run 400					
12589'	12589'	89.88°	267.51°	6609.66'	6408.76'
12600'					



12650'

12700'

12750'

12800'

12850'

12900'

12950'

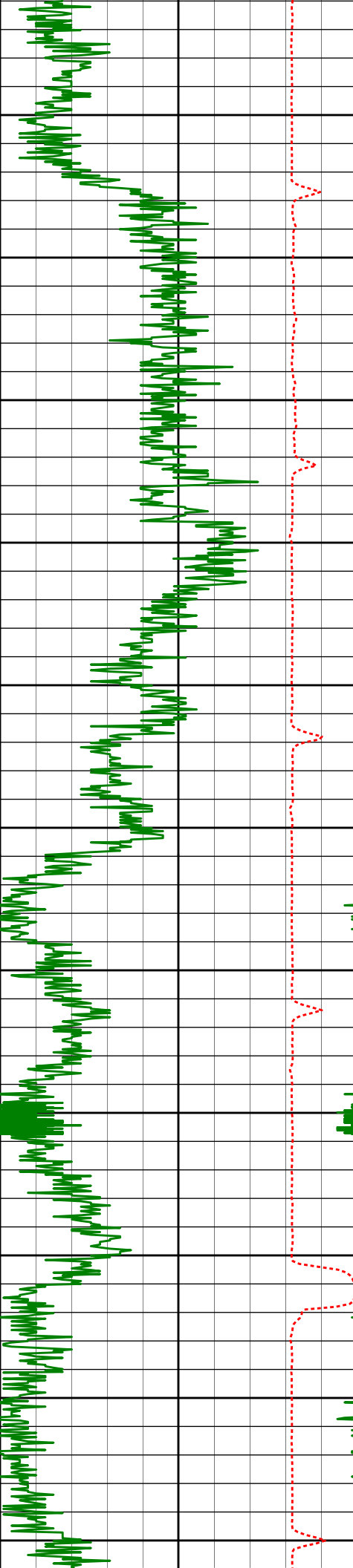
13000'

13050'

13100'

13150'

12684'	90.62°	267.01°	6609.25'	6503.74'
12779'	89.63°	267.99°	6609.04'	6598.73'
12874'	89.32°	268.10°	6609.91'	6693.72'
12969'	89.63°	269.68°	6610.78'	6788.71'
13064'	89.45°	269.63°	6611.55'	6883.68'
13159'	89.29°	269.06°	6612.59'	6978.66'



13200'

13250'

13300'

13350'

13400'

13450'

13500'

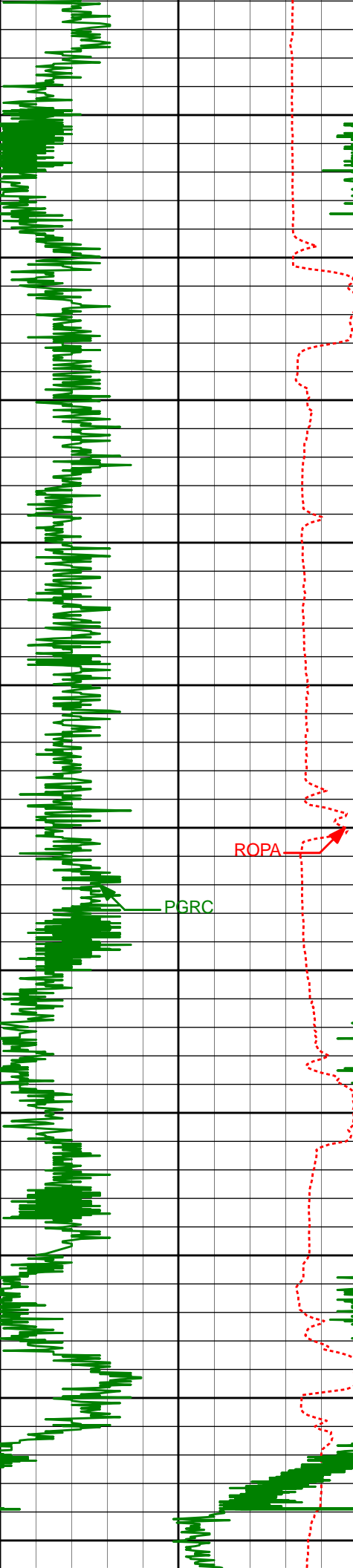
13550'

13600'

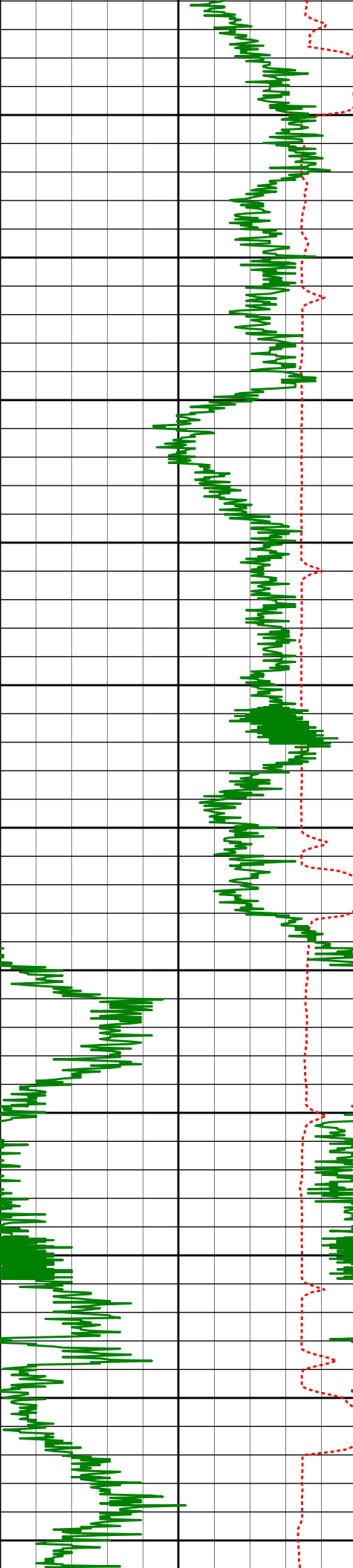
13650'

13700'

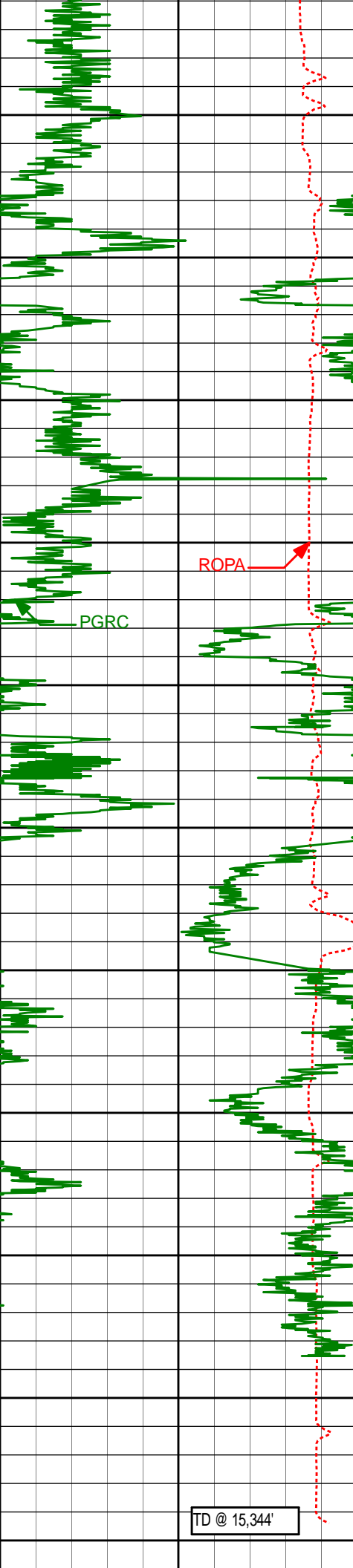
13199'	89.29°	269.00°	6612.93'	6976.00'
13254'	89.48°	268.87°	6613.61'	7073.65'
13349'	90.03°	268.87°	6614.02'	7168.64'
13443'	89.97°	268.10°	6614.02'	7262.64'
13538'	90.22°	267.72°	6613.86'	7357.64'
13633'	89.88°	268.03°	6613.78'	7452.64'



13728'	89.26°	267.62°	6614.49'	7547.63'
13750'				
13800'				
13823'	89.05°	268.56°	6615.89'	7642.62'
13850'				
13900'				
13918'	89.14°	267.42°	6617.39'	7737.60'
13950'				
14000'				
14012'	88.27°	265.48°	6619.51'	7831.52'
14050'				
14100'				
14107'	90.28°	266.60°	6620.73'	7926.43'
14150'				
14200'				
14202'	90.86°	267.62°	6619.78'	8021.41'
14250'				



14300'	14296'	90.80°	269.63°	6618.42'	8115.39'
14350'					
14400'	14392'	91.14°	268.59°	6616.80'	8211.37'
14450'					
14500'	14487'	91.57°	268.49°	6614.55'	8306.34'
14550'					
14600'	14582'	91.11°	269.77°	6612.33'	8401.30'
14650'					
14700'	14676'	91.11°	269.55°	6610.51'	8495.26'
14750'					
14800'	14771'	90.34°	270.86°	6609.31'	8590.19'



14850'

14900'

14950'

15000'

15050'

15100'

15150'

15200'

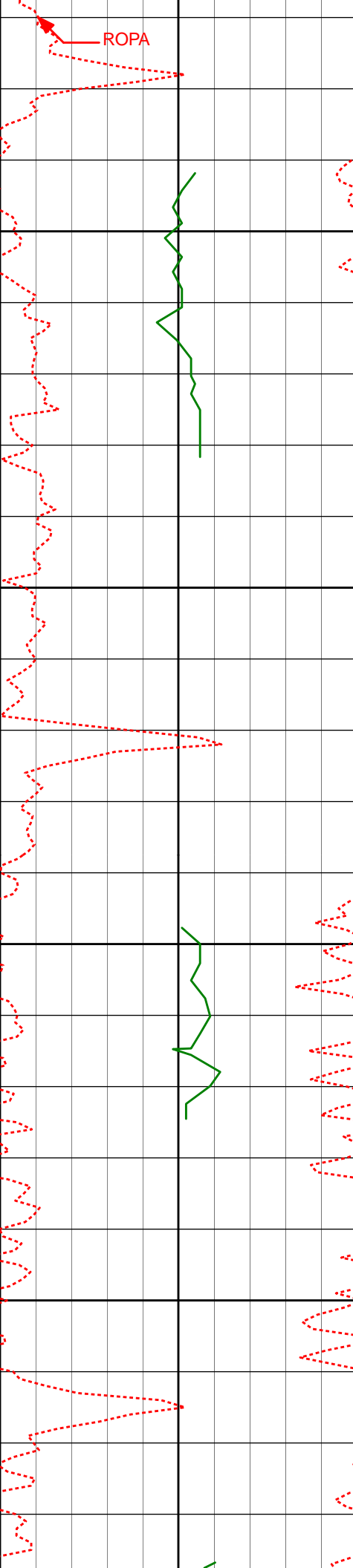
15250'

15300'

15350'

14866'	90.59°	270.54°	6608.54'	8685.11'
14961'	90.93°	270.01°	6607.28'	8780.04'
15056'	91.48°	269.44°	6605.28'	8874.99'
15151'	90.96°	270.17°	6603.26'	8969.94'
15278'	91.54°	269.99°	6600.49'	9096.85'

<div>Gamma CG Cor PGRC</div> <div>0200</div> <div>api</div>										Measured Depth (ft) 1:600	DepthIncAzi.				TVDV.S.				
<div>Average Rate of Penetration ROPA</div> <div>1K0</div> <div>feet per hr</div>																			
<div>HALLIBURTON</div> <div>MD Main Log 1:240</div>																			
<div>Average Rate of Penetration ROPA</div> <div>1K0</div> <div>feet per hr</div>																			
<div>Gamma CG Cor PGRC</div> <div>0200</div> <div>api</div>										Measured Depth (ft) 1:240	DepthIncAzi.				TVDV.S.				
<div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div>										3000'									
										3050'									
										3066'	0.31°	275.15°	3058.01'	93.47'					
										3100'									



3150'

3160'

0.22°

346.41°

3152.01'

93.76'

3200'

3250'

3255'

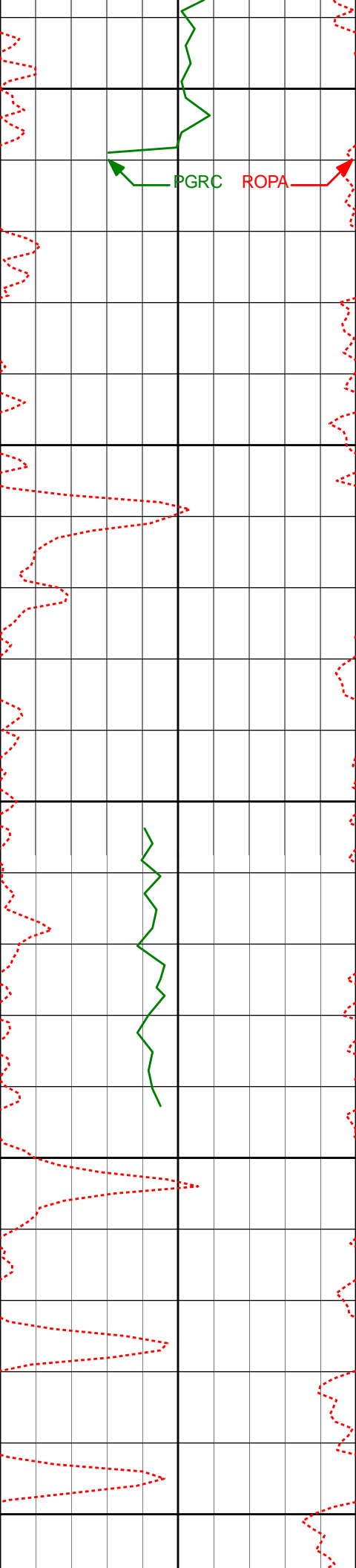
0.33°

94.67°

3247.01'

93.52'

3300'



3350'

3350'

0.62°

286.56°

3342.01'

93.74'

3400'

3450'

3444'

0.47°

225.25°

3436.01'

94.50'

3500'

3550'

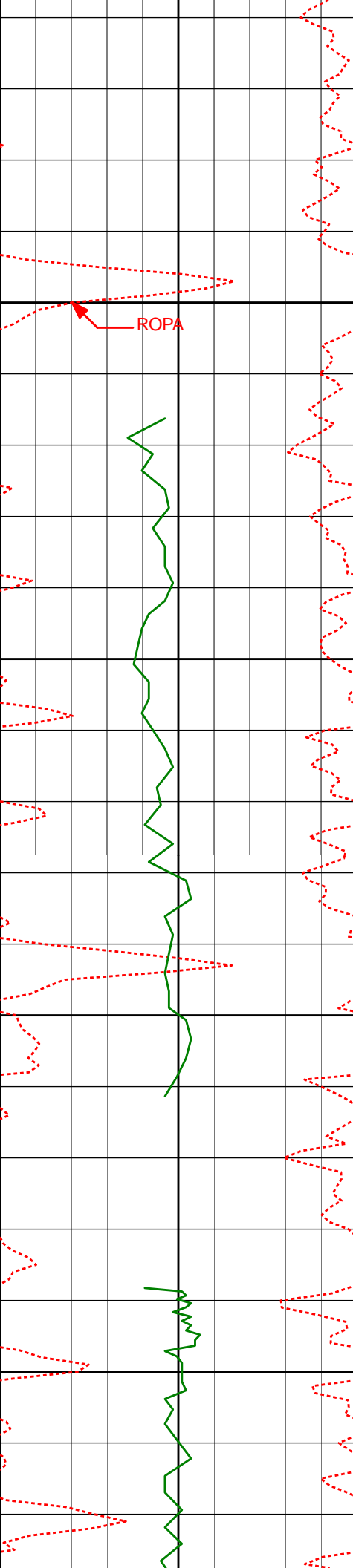
3539'

0.56°

193.62°

3531.00'

94.91'



3600'

3634'

0.88°

204.33°

3626.00'

95.35'

3650'

3700'

3728'

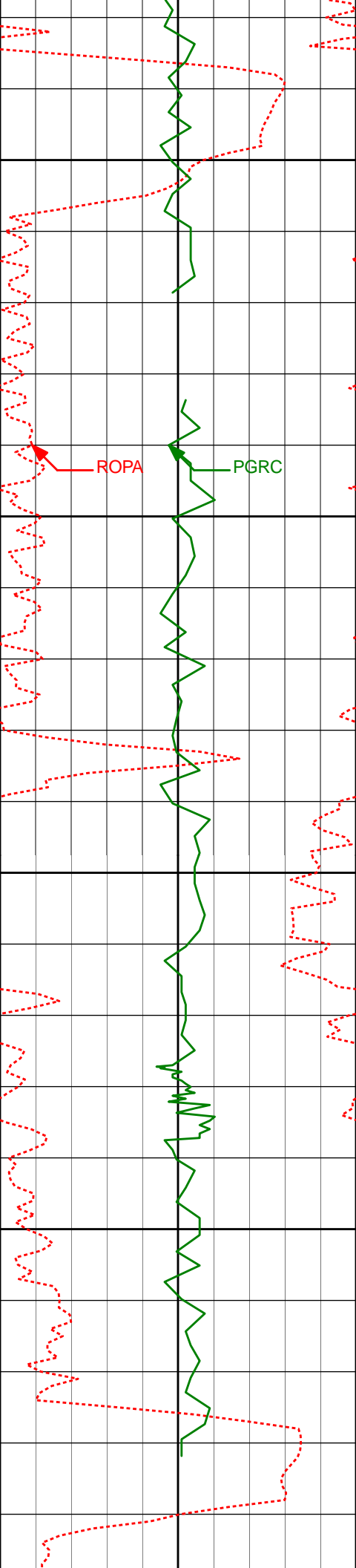
0.77°

204.37°

3719.99'

95.95'

3750'



3800'

3823'

0.62°

249.05°

3814.98'

96.71'

3850'

3900'

3918'

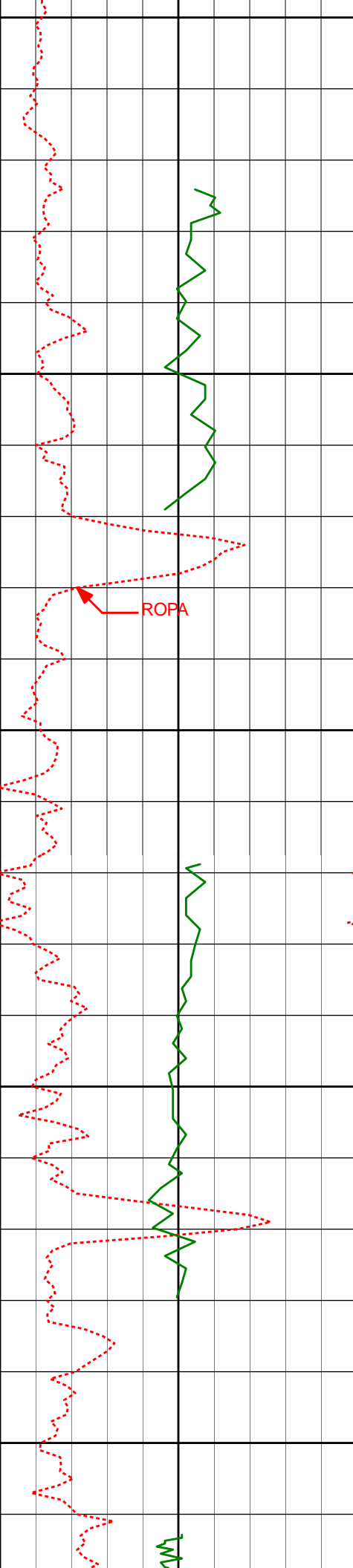
0.72°

235.47°

3909.97'

97.70'

3950'



4000'

4013'

0.23°

213.17°

4004.97'

98.31'

4050'

4100'

4108'

0.17°

36.01°

4099.97'

98.33'

4150'

4200'

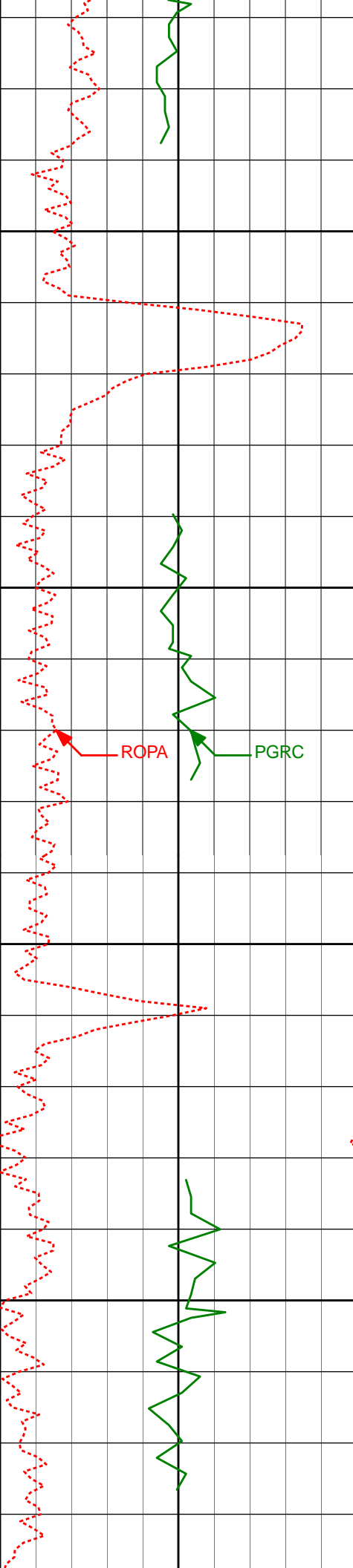
4202'

0.13°

230.77°

4193.97'

98.33'



4250'

4300'

4350'

4400'

ROPA

PGRC

4297'

0.18°

179.46°

4288.97'

98.42'

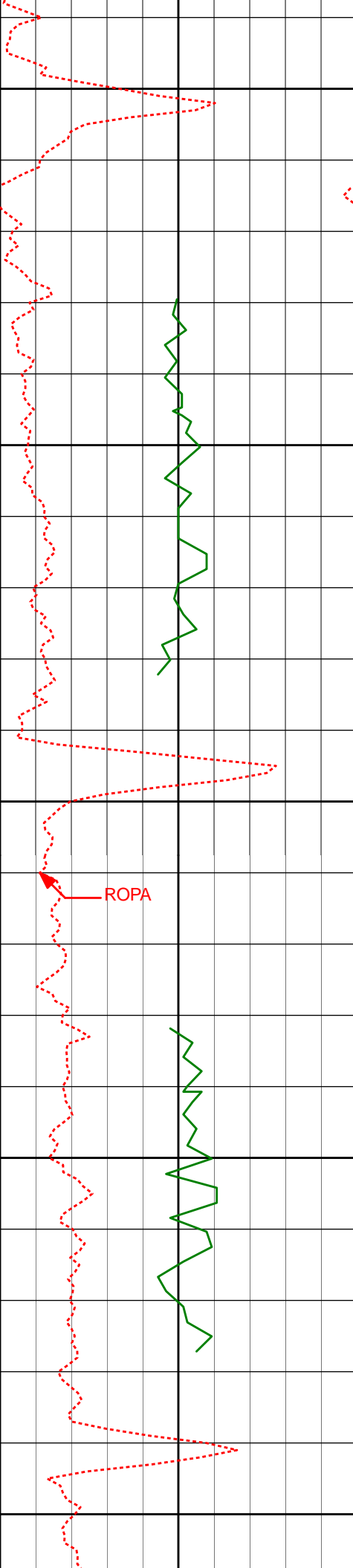
4392'

0.10°

299.47°

4383.97'

98.50'



4450'

4487'

0.28°

1.94°

4478.97'

98.55'

4500'

4550'

4582'

0.37°

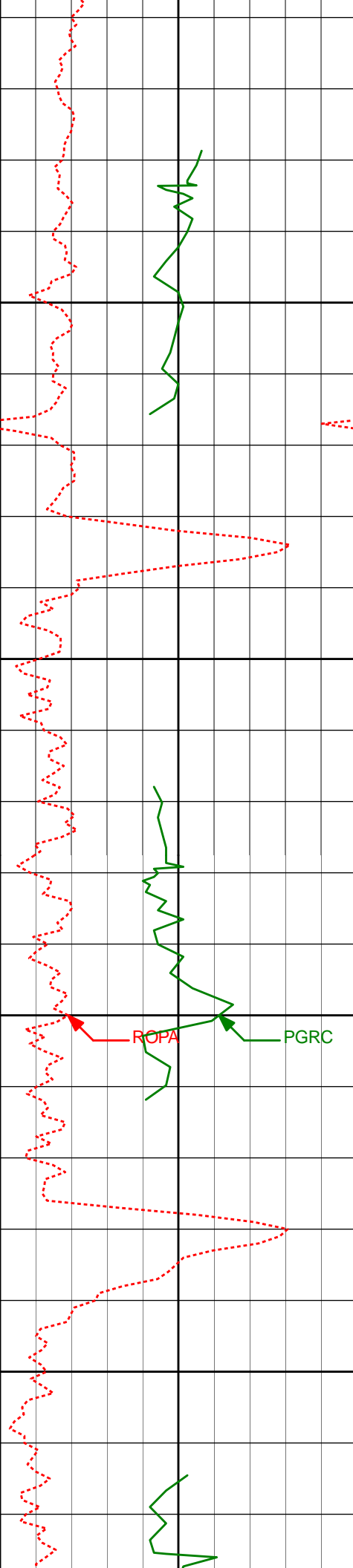
308.51°

4573.97'

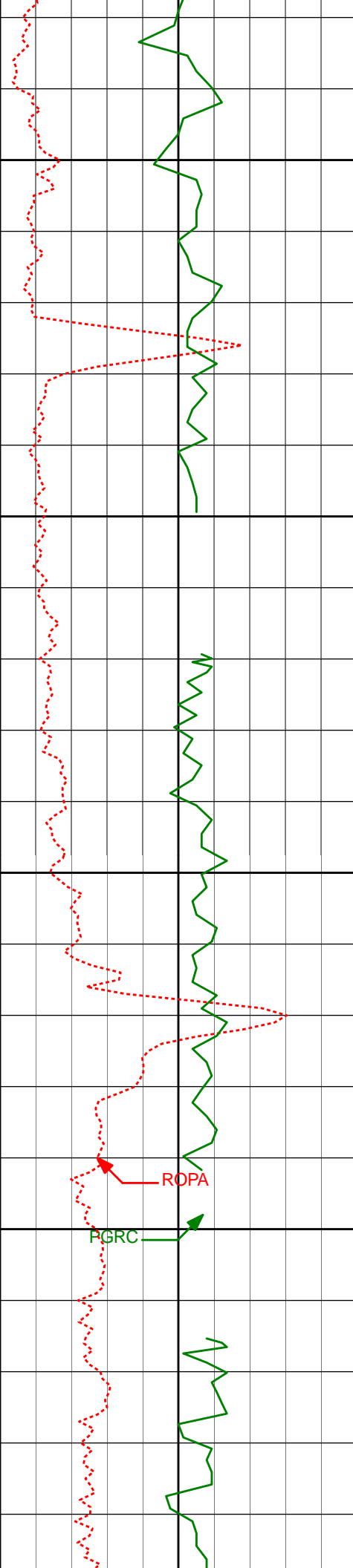
98.77'

4600'

4650'



4677'	0.63°	319.97°	4668.96'	99.33'
4700'				
4750'				
4771'	0.52°	301.43°	4762.96'	100.01'
4800'				
4850'				
4866'	0.18°	322.68°	4857.96'	100.46'



4900'

4950'

5000'

5050'

4961'

0.13°

324.35°

4952.96'

100.60'

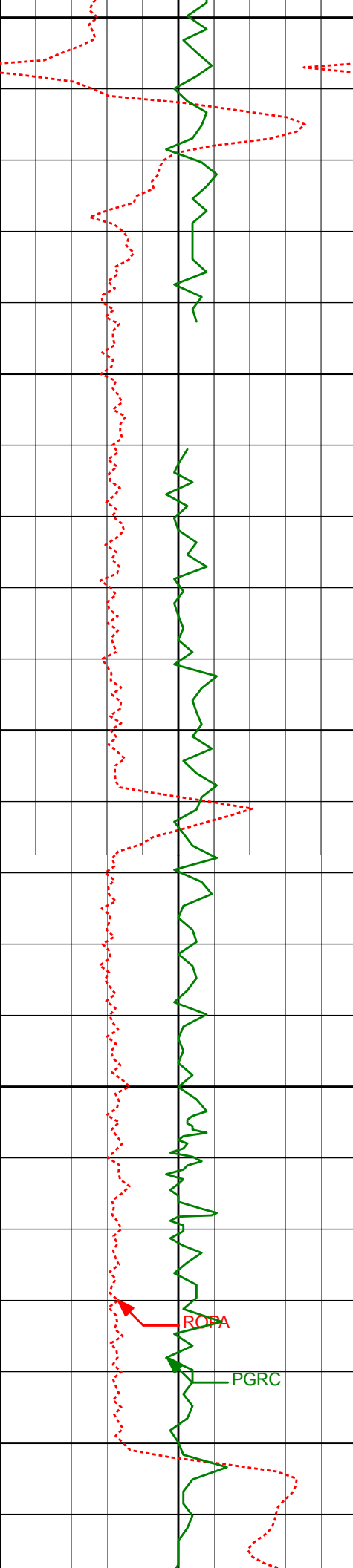
5056'

0.39°

299.79°

5047.96'

100.94'



5100'

5150'

5200'

5250'

5300'

5151'

0.80°

243.36°

5142.95'

101.82'

5246'

0.80°

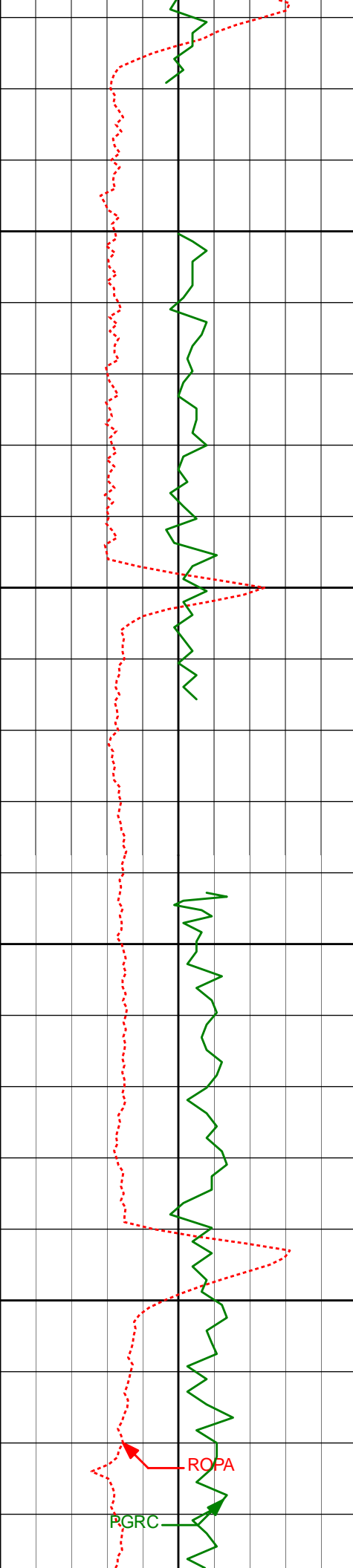
265.98°

5237.94'

103.08'

ROPA

PGRC



5350'

5400'

5450'

5500'

5340'

0.73°

303.58°

5331.93'

104.22'

5435'

0.89°

265.43°

5426.92'

105.45'

5530'

0.81°

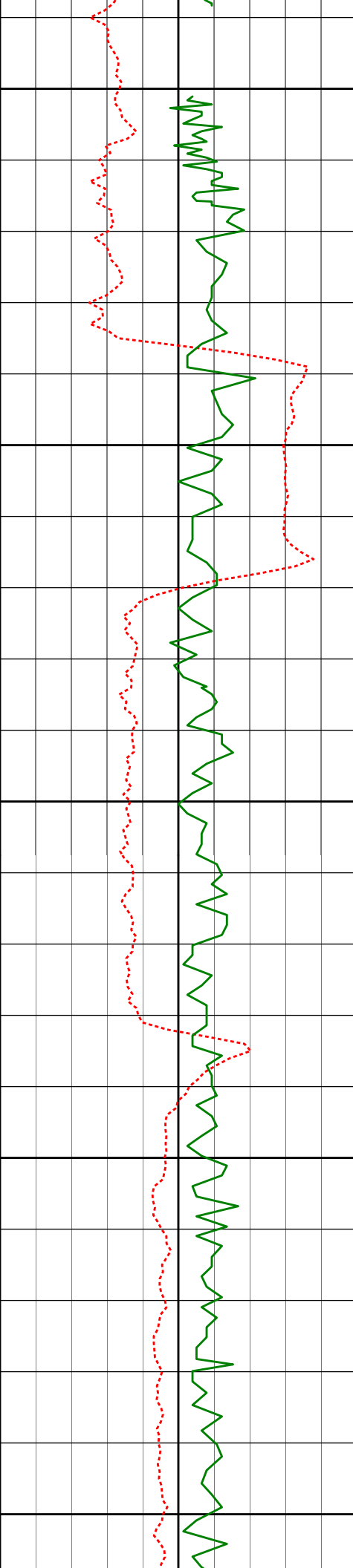
288.19°

5521.91'

106.82'

ROPA

PGRC



5550'

5600'

5650'

5700'

5750'

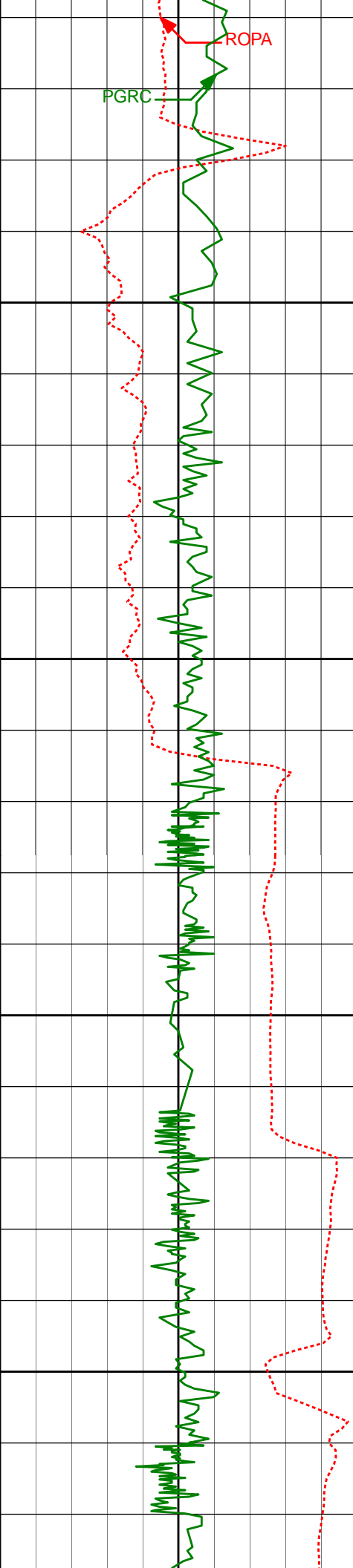
5719'

0.65°

278.74°

5710.90'

109.13'



Run200

5800'

5850'

5900'

5950'

5812'

0.86°

276.09°

5803.89'

110.34'

5907'

0.89°

287.28°

5898.88'

111.75'

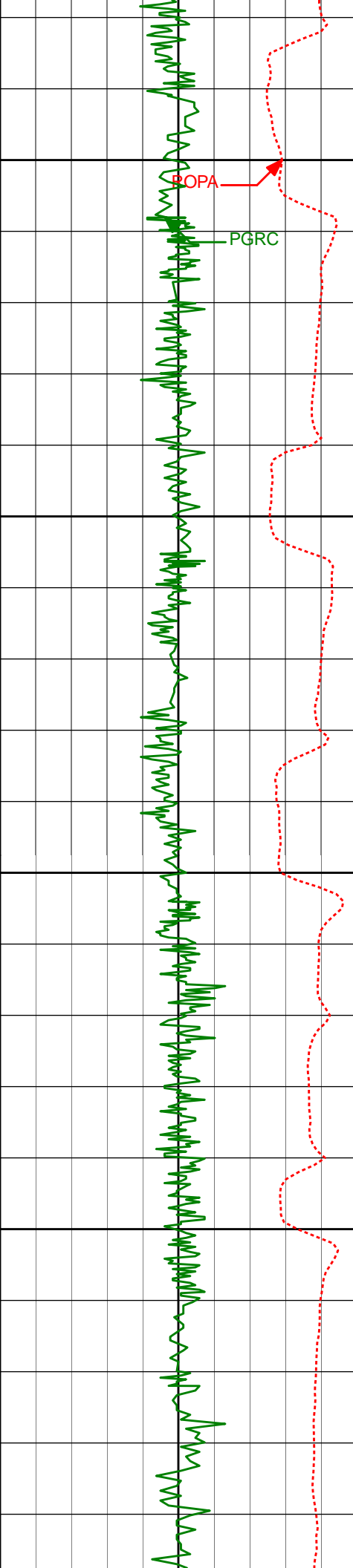
5955'

3.88°

270.43°

5946.83'

113.72'



6000'

6002'

7.18°

265.40°

5993.61'

118.25'

6050'

6050'

10.67°

260.48°

6041.02'

125.64'

6100'

6097'

13.82°

264.98°

6086.95'

135.55'

6150'

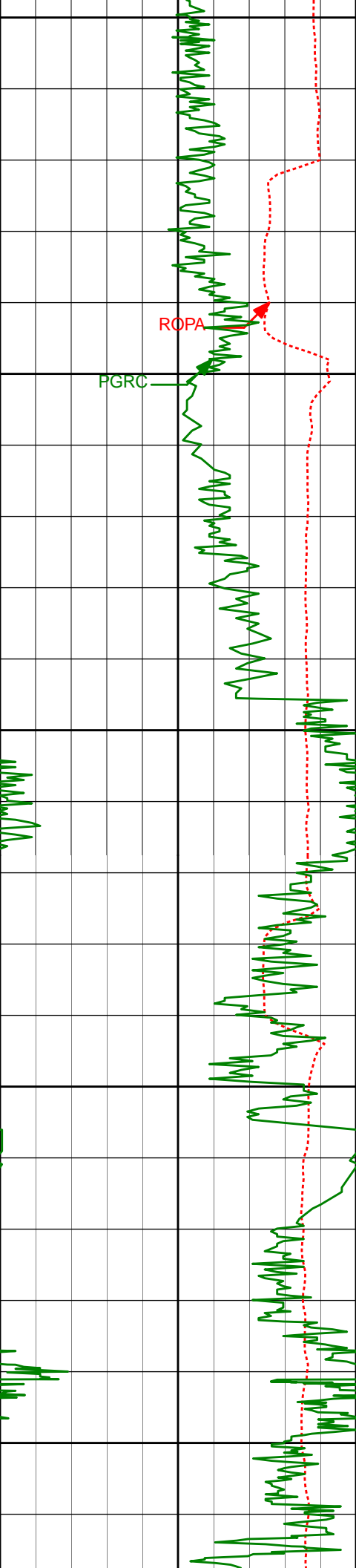
6192'

22.83°

269.77°

6177.04'

165.37'



6287'

30.17°

269.82°

6262.00'

207.72'

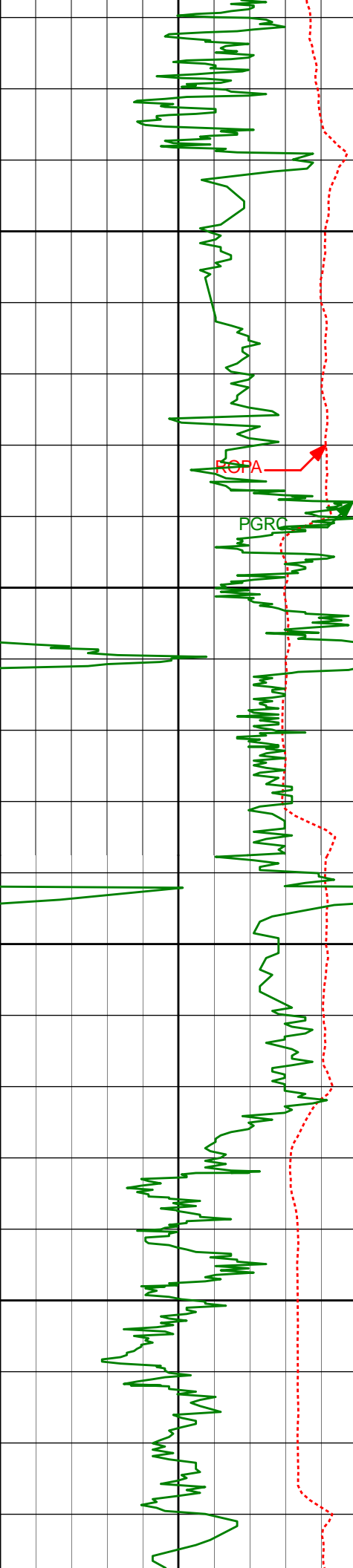
6381'

40.49°

267.13°

6338.59'

261.99'



6450'

6476'

55.14°

266.62°

6402.21'

332.12'

ROFA

PGRC

6500'

6550'

6571'

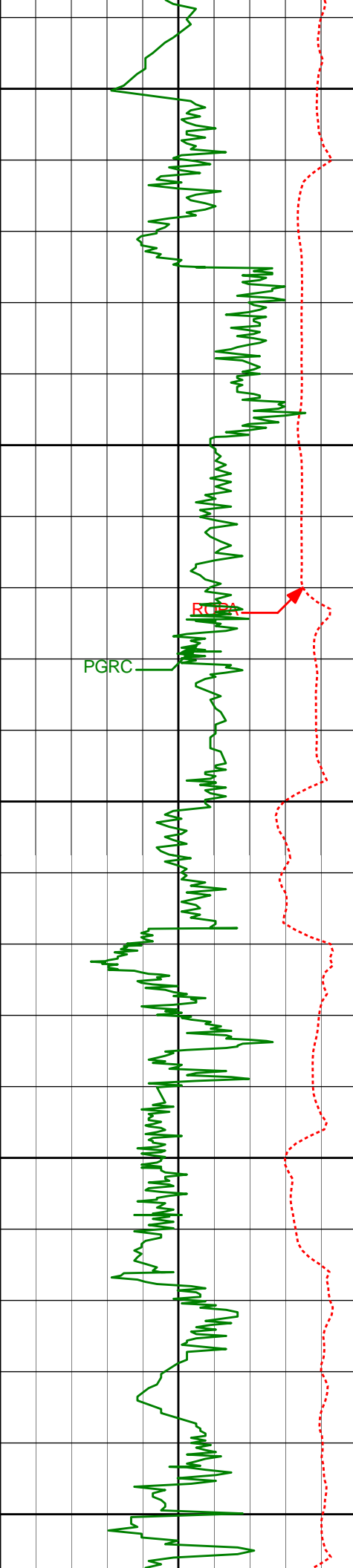
61.81°

268.39°

6451.86'

412.99'

6600'



6650'

6666'

66.70°

267.79°

6493.11'

498.49'

6700'

6750'

6760'

70.65°

270.89°

6527.30'

586.02'

6800'

6808'

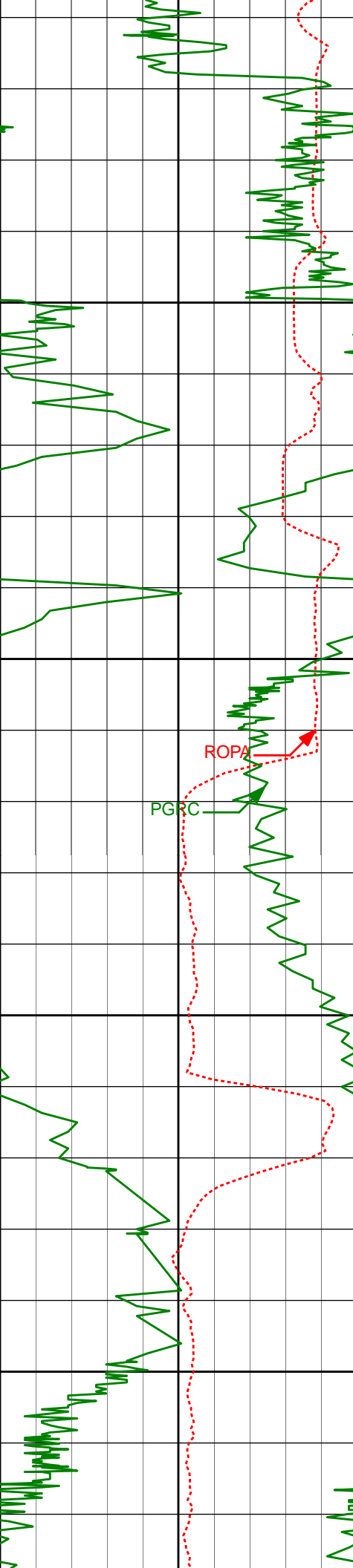
74.33°

271.23°

6541.74'

631.78'

6850'



6900'

Casing Shoe @ 6904'

Run 300

6950'

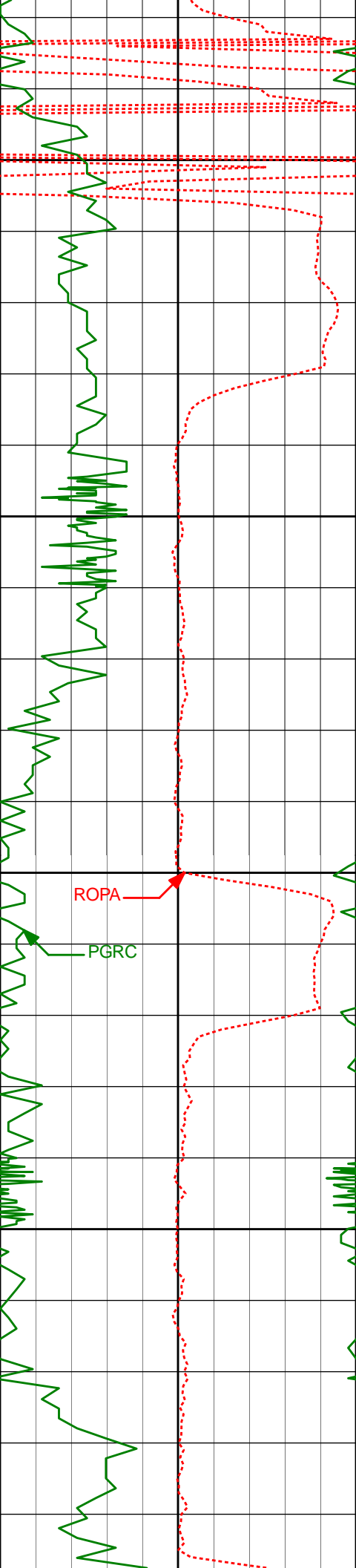
ROP

PGRC

7000'

7050'

6859'	81.04°	271.31°	6552.61'	681.57'
6946'	87.13°	270.17°	6561.57'	768.03'
7040'	90.99°	268.93°	6563.11'	861.97'



7100'

7135'

89.72°

268.24°

6562.52'

956.97'

7150'

7200'

ROPA

PGRC

7230'

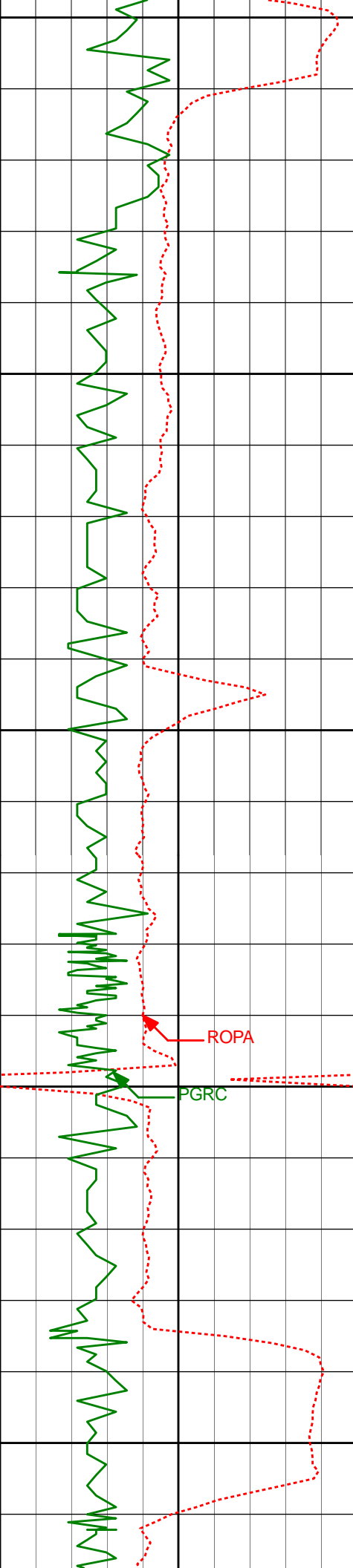
90.09°

270.13°

6562.68'

1051.95'

7250'



7300'

7325'

88.77°

270.30°

6563.63'

1146.89'

7350'

7400'

7420'

89.72°

267.97°

6564.88'

1241.87'

7450'

7500'

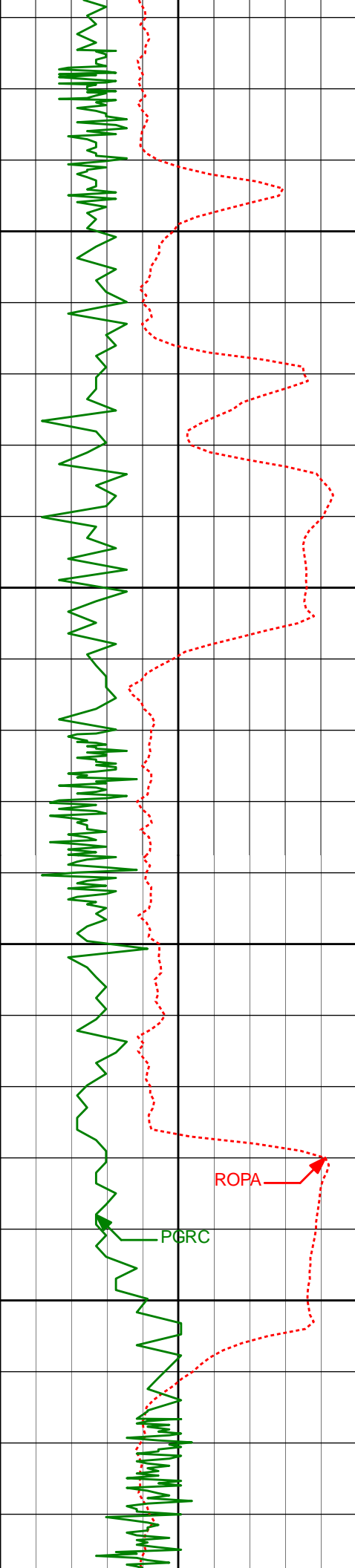
7515'

89.23°

266.96°

6565.75'

1336.85'



7550'

7600'

7650'

7700'

7609'

89.32°

266.63°

6566.94'

1430.81'

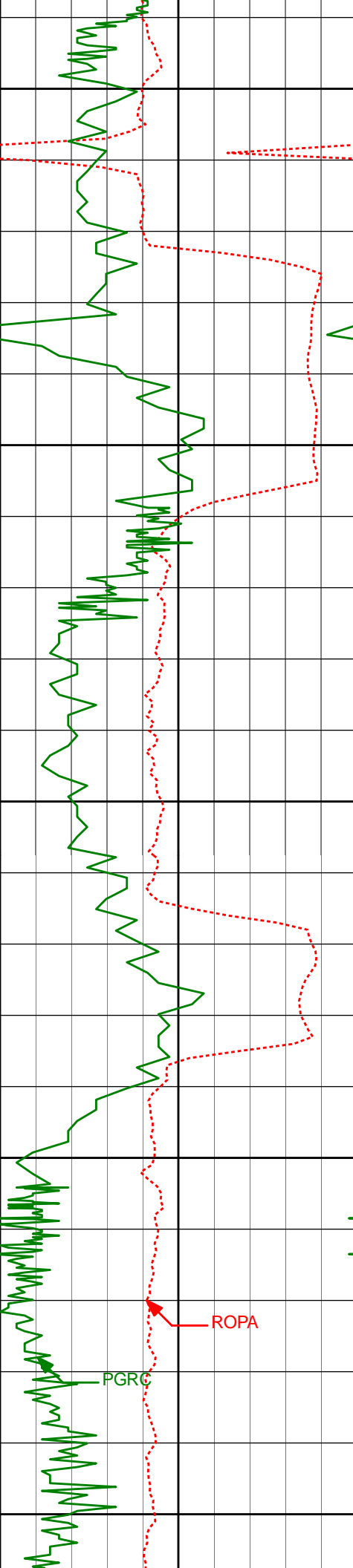
7704'

89.11°

266.76°

6568.24'

1525.76'



7750'

7800'

7850'

7900'

7950'

7799'

7894'

88.61°

91.02°

268.46°

269.73°

6570.13'

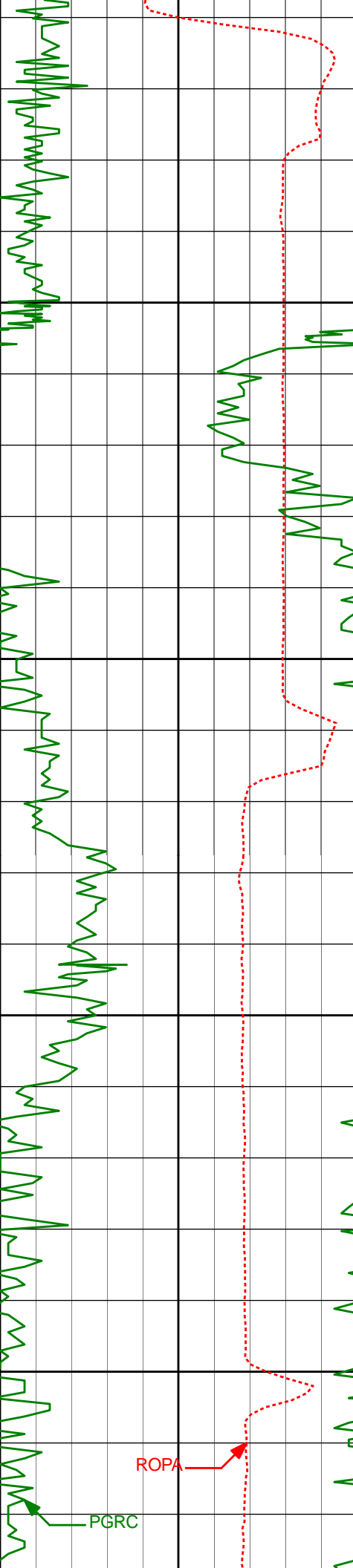
6570.44'

1620.73'

1715.72'

PGRC

ROPA



7989'

89.04°

272.80°

6570.39'

1810.58'

8000'

8050'

8083'

89.29°

270.45°

6571.76'

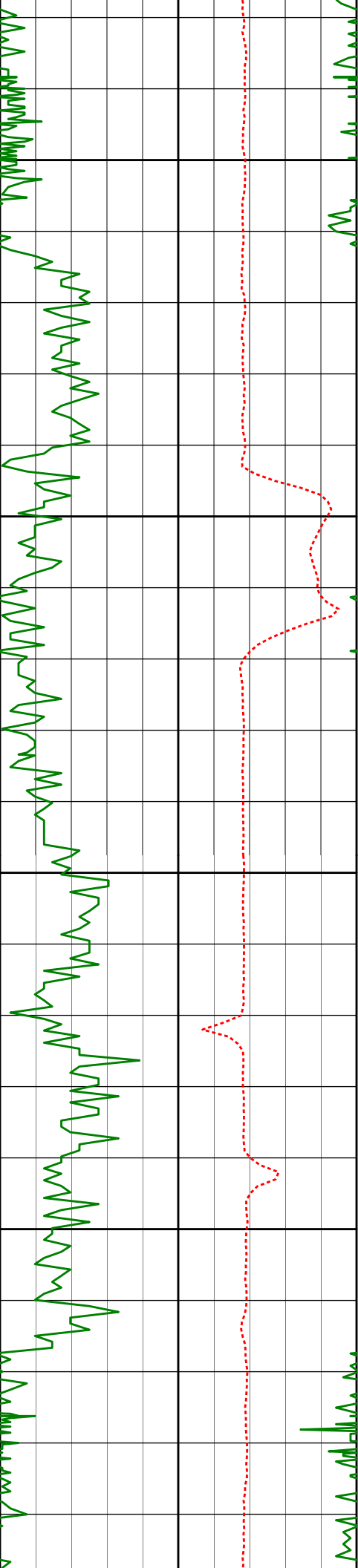
1904.40'

8100'

8150'

ROPA

PGRC



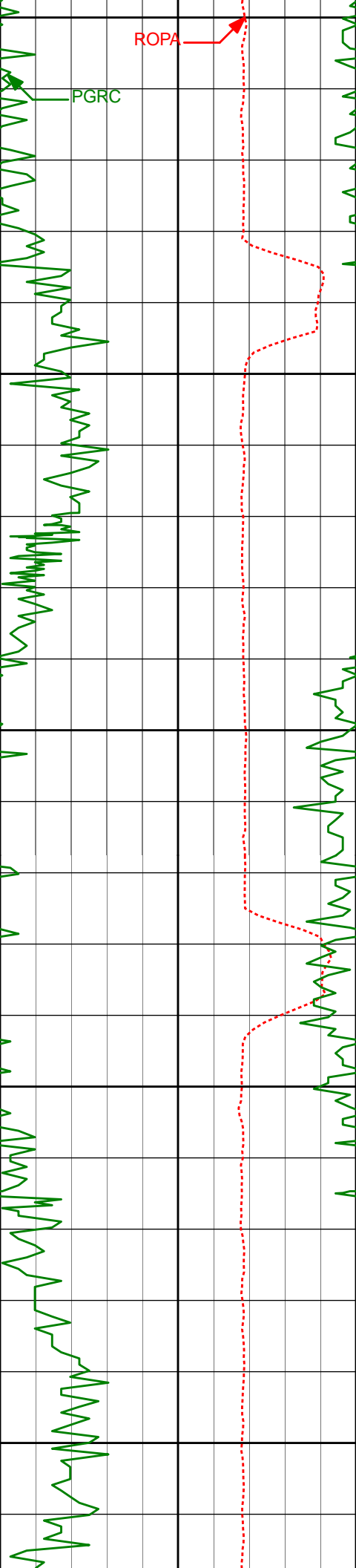
8200'

8250'

8300'

8350'

8178'	88.12°	268.80°	6573.90'	1999.35'
8272'	89.57°	269.94°	6575.80'	2093.31'
8367'	90.80°	269.94°	6575.49'	2188.26'



8400'

8450'

8500'

8550'

8600'

8462'

88.21°

268.57°

6576.31'

2283.24'

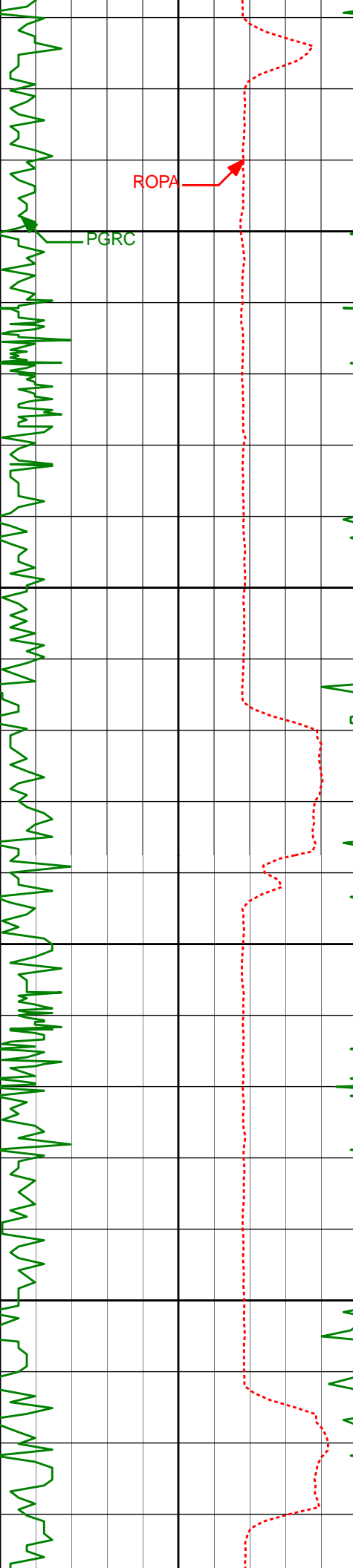
8556'

88.92°

269.00°

6578.67'

2377.20'



ROPA

PGRC

8650'

8700'

8750'

8800'

8651'

89.51°

268.42°

6579.97'

2472.19'

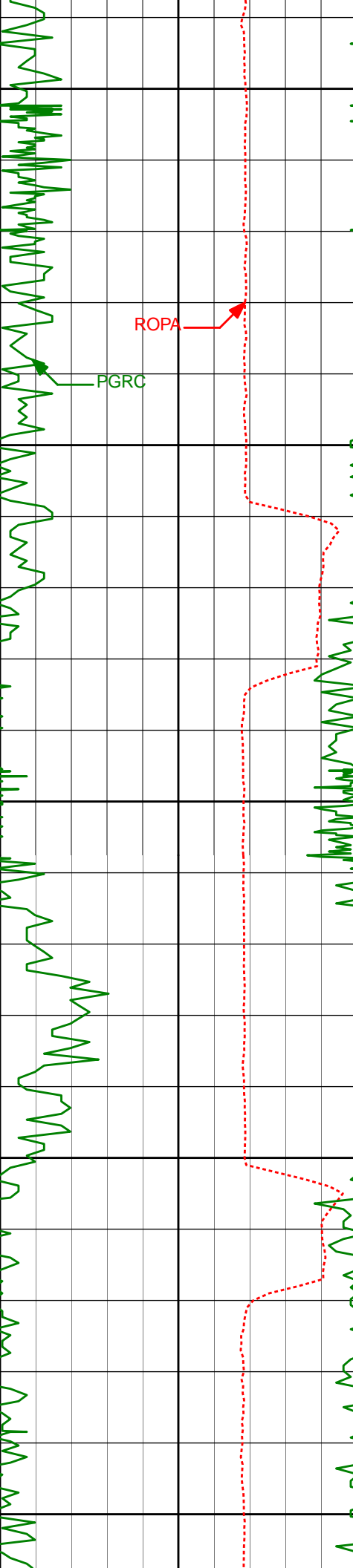
8746'

89.75°

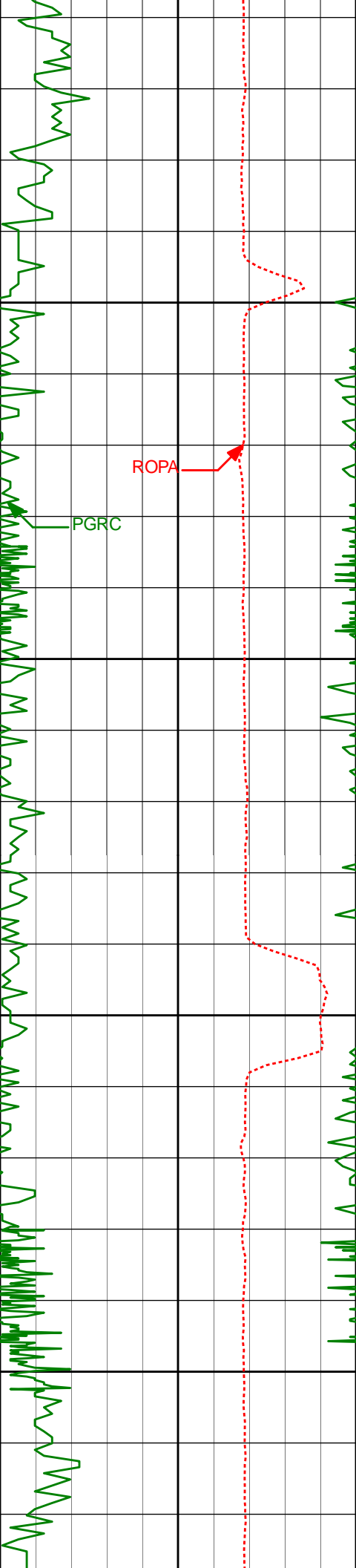
268.72°

6580.58'

2567.19'



8841'	89.48°	267.98°	6581.22'	2662.19'
8850'				
8900'				
8935'	90.74°	268.86°	6581.04'	2756.18'
8950'				
9000'				
9030'	89.48°	269.18°	6580.86'	2851.17'
9050'				



9100'

9150'

9200'

9250'

9125'

89.63°

268.69°

6581.59'

2946.17'

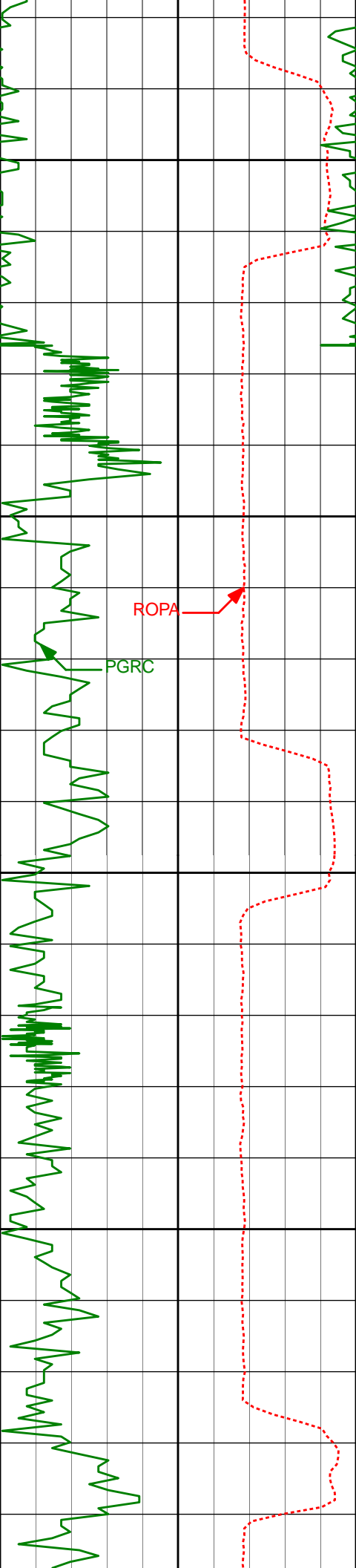
9220'

89.38°

266.69°

6582.42'

3041.15'



9300'

9315'

90.96°

268.45°

6582.13'

3136.14'

9350'

ROPA

PGRC

9400'

9410'

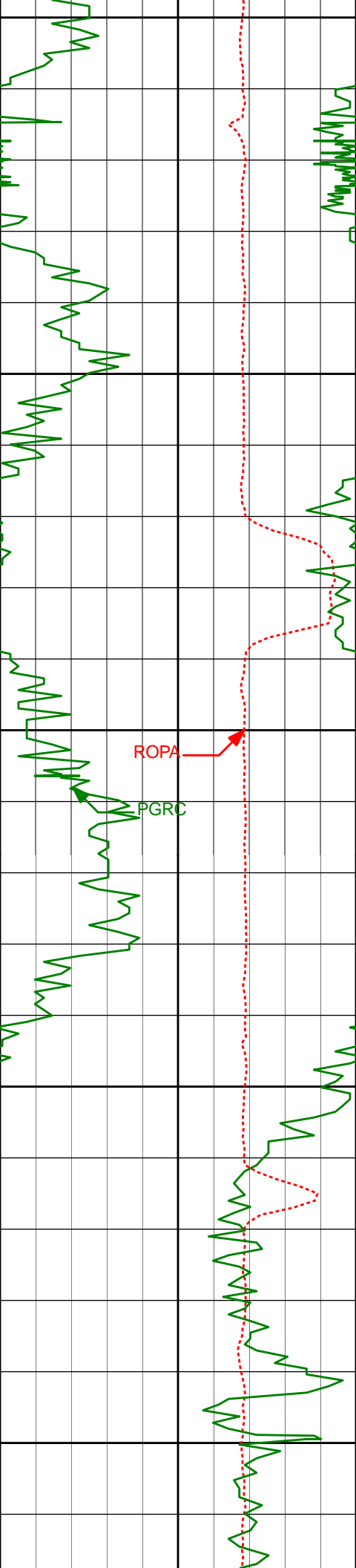
90.71°

270.39°

6580.75'

3231.10'

9450'



9500'

9505'

87.90°

269.30°

6581.90'

3326.05'

9550'

9600'

ROPA

PGRC

9650'

9700'

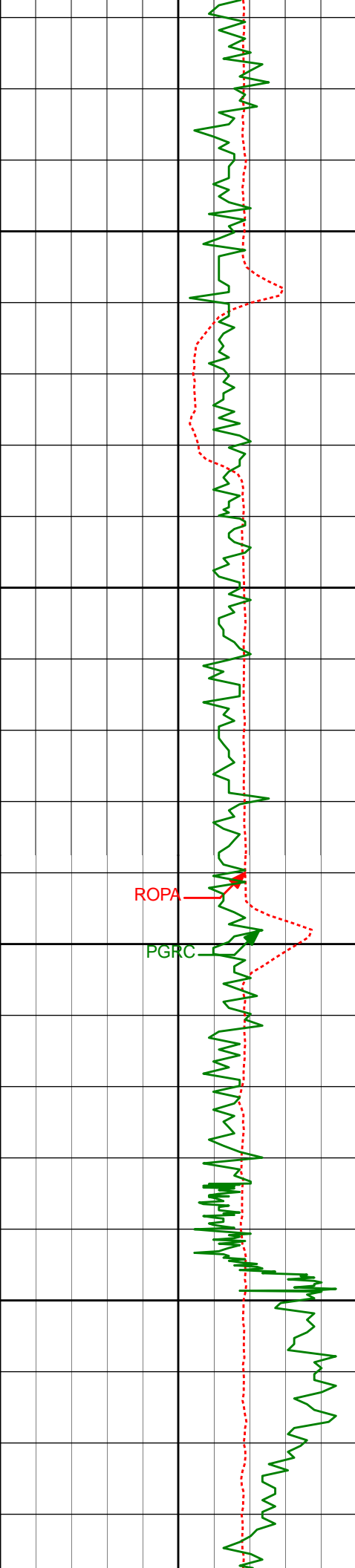
9688'

89.14°

269.66°

6586.97'

3508.91'



9750'

9781'

89.88°

269.36°

6587.77'

3601.89'

9800'

ROPA

PGRC

9850'

9873'

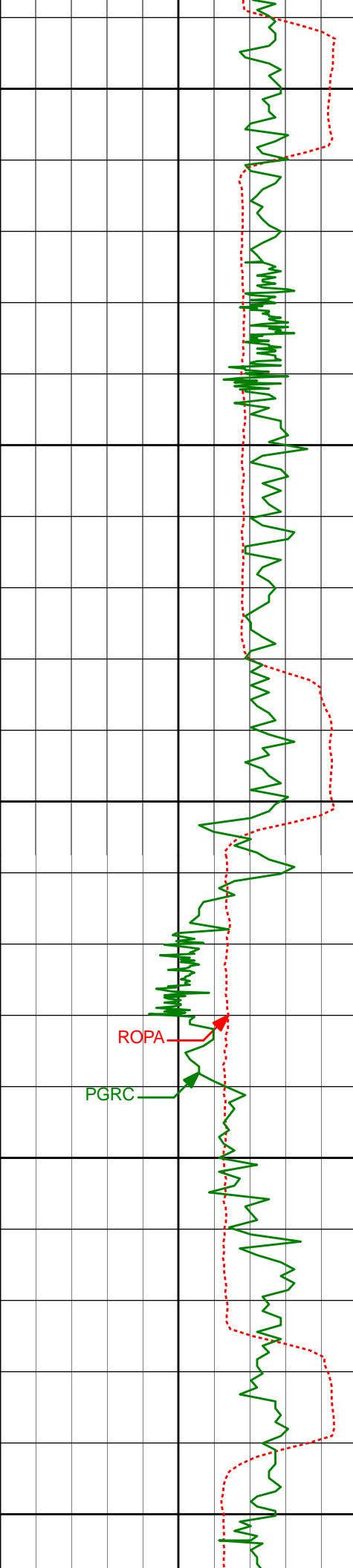
88.52°

267.20°

6589.05'

3693.87'

9900'



9950'

9966'

88.43°

268.41°

6591.53'

3786.83'

10000'

10050'

10059'

89.88°

268.67°

6592.90'

3879.82'

10100'

10150'

10151'

90.99°

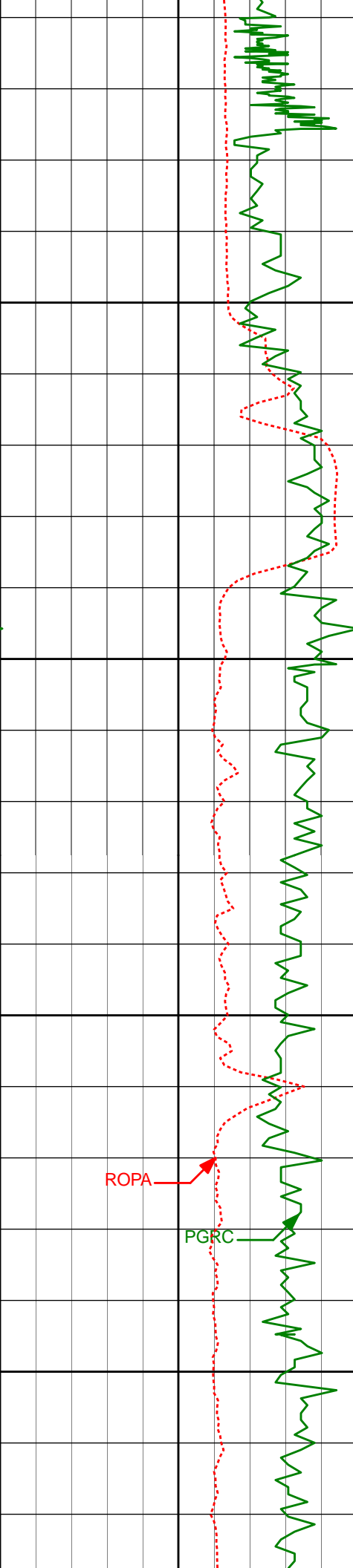
269.44°

6592.20'

3971.81'

ROPA

PGRC



10200'

10250'

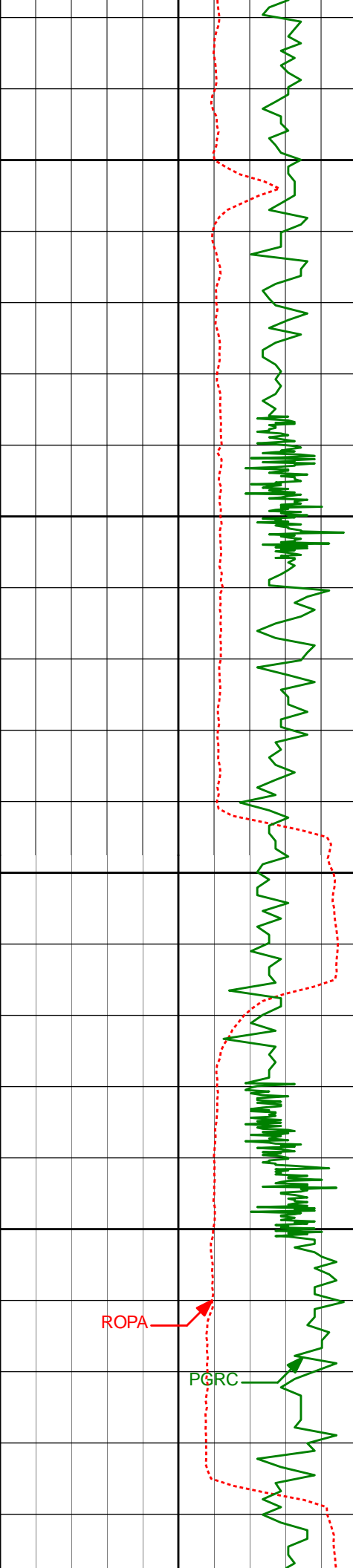
10300'

10350'

ROPA

PGRC

10243'	89.91°	270.30°	6591.48'	4063.77'
10335'	89.41°	268.95°	6592.03'	4155.74'



10400'

10428'

89.57°

266.81°

6592.85'

4248.73'

10450'

10500'

10521'

89.54°

267.38°

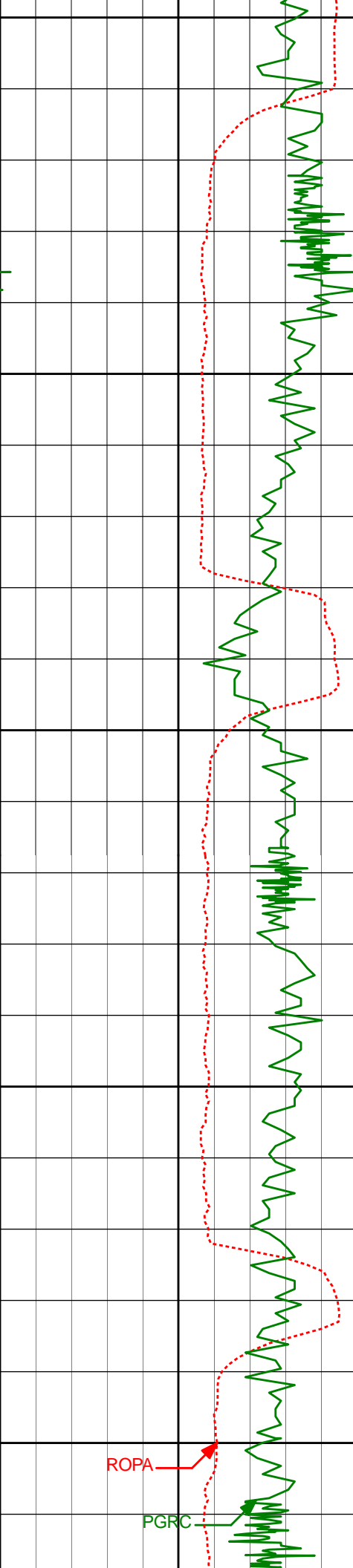
6593.58'

4341.70'

10550'

ROPA

PGRC



10600'

10614'

90.28°

268.65°

6593.72'

4434.70'

10650'

10700'

10708'

88.49°

269.14°

6594.73'

4528.68'

10750'

10800'

ROPA

PGRC

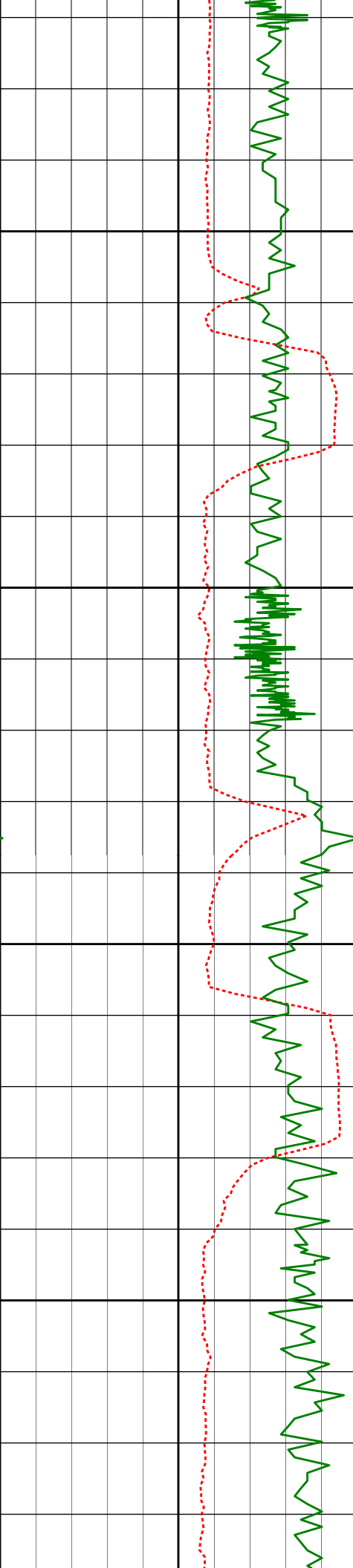
10801'

90.37°

270.13°

6595.66'

4621.65'



10850'

10900'

10950'

11000'

10893'

91.20°

270.89°

6594.40'

4713.57'

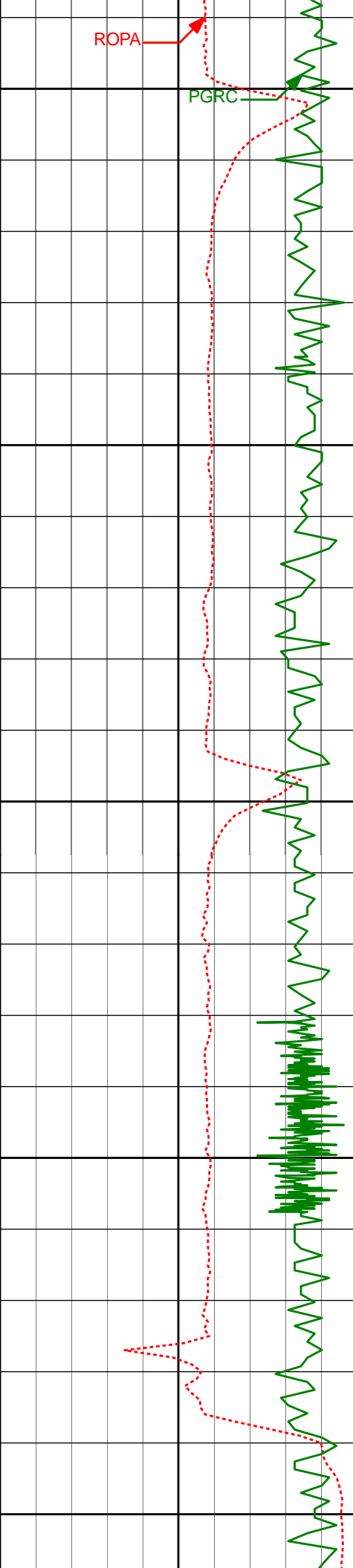
10986'

89.48°

270.70°

6593.84'

4806.48'



ROPA

PGRC

11050'

11078'

89.78°

268.52°

6594.43'

4898.45'

11100'

11150'

11172'

89.91°

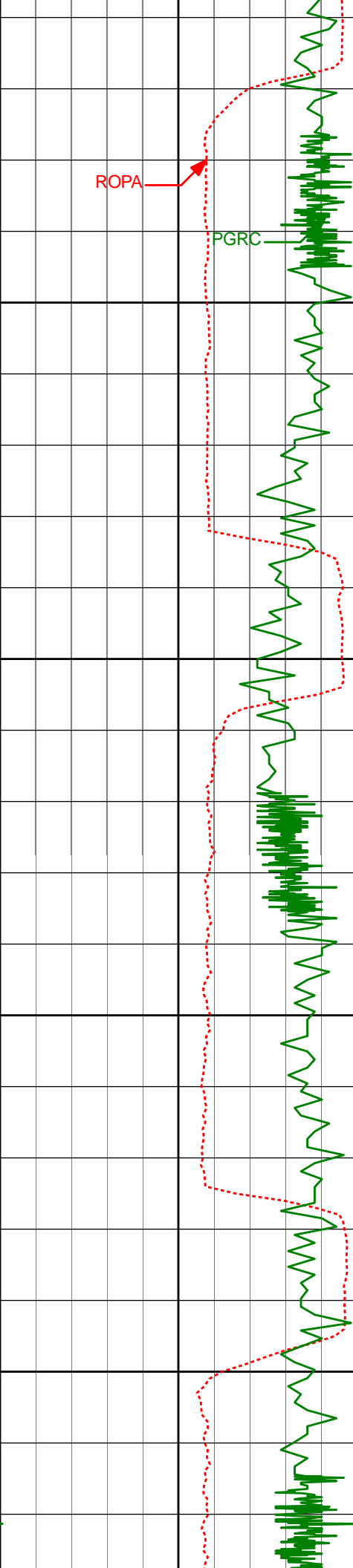
266.89°

6594.68'

4992.44'

11200'

11250'



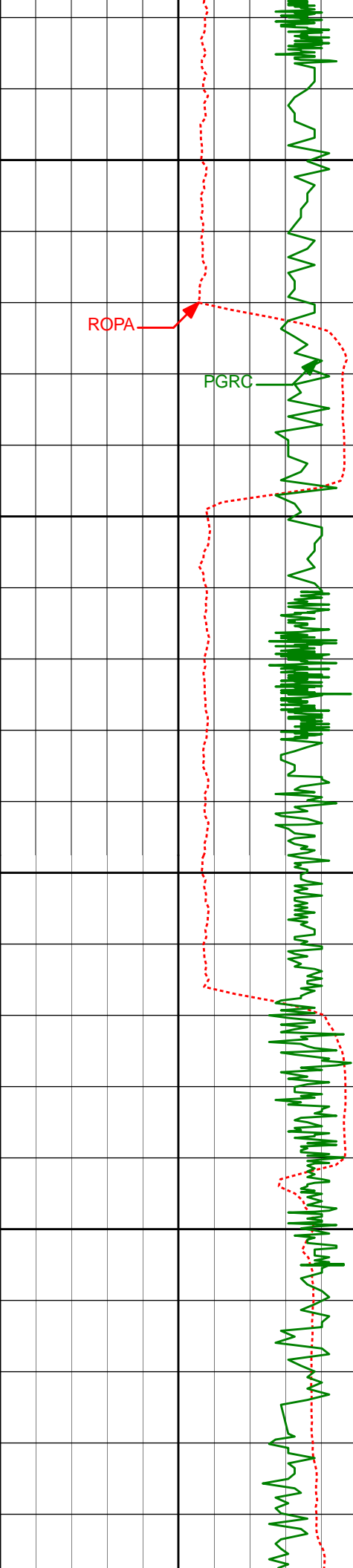
11300'

11350'

11400'

11450'

11267'	89.63°	267.84°	6595.07'	5087.43'
11361'	89.57°	268.49°	6595.72'	5181.42'
11455'	90.03°	268.54°	6596.05'	5275.42'



11500'

11550'

11600'

11650'

ROPA

PGRC

11550'

11644'

11650'

89.75°

89.41°

269.30°

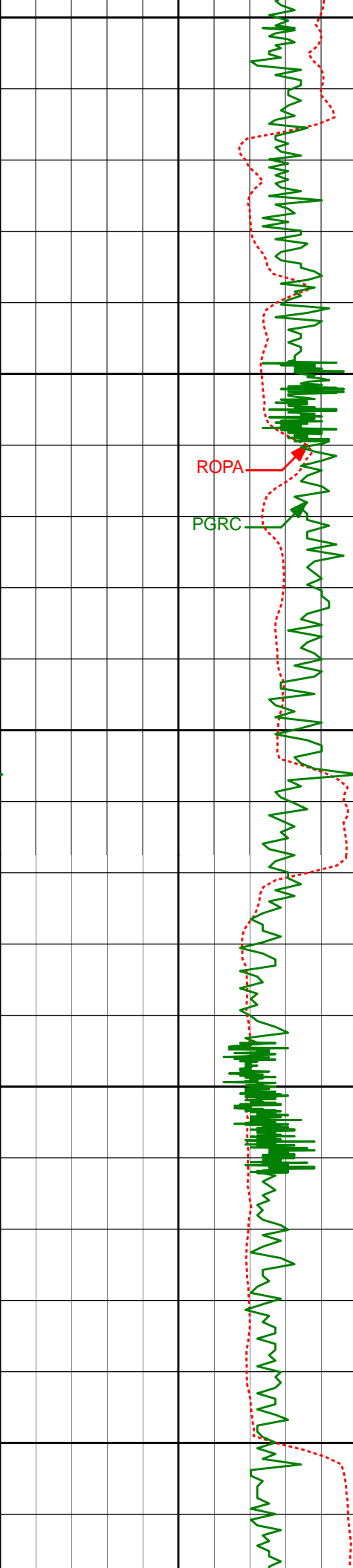
270.84°

6596.23'

6596.92'

5370.42'

5464.36'



11700'

11739'

90.15°

270.85°

6597.29'

5559.27'

11750'

ROPA

PGRC

11800'

11833'

89.08°

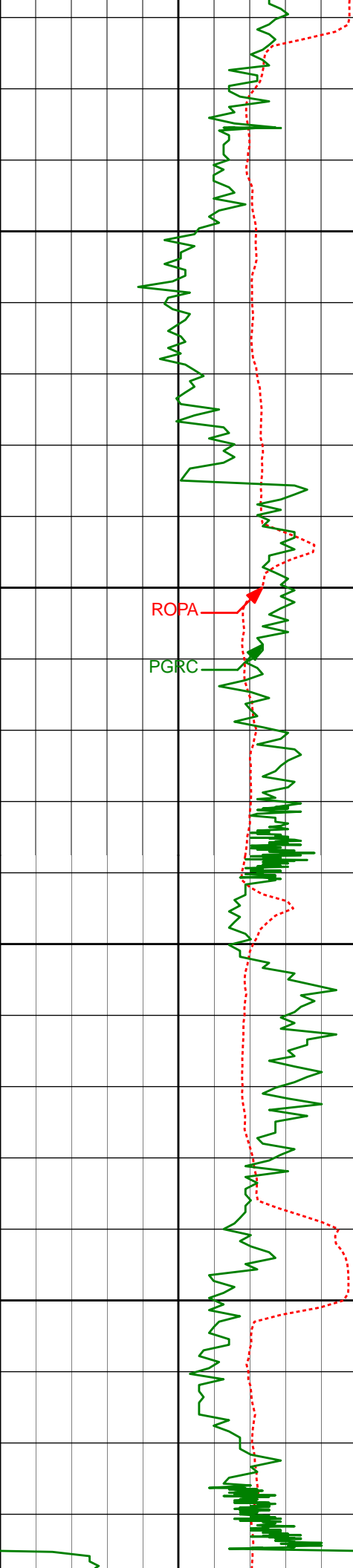
272.40°

6597.92'

5653.11'

11850'

11900'



11928'

87.84°

269.40°

6600.48'

5747.96'

11950'

12000'

ROPA

PGRC

12022'

87.81°

269.30°

6604.05'

5841.88'

12050'

12100'

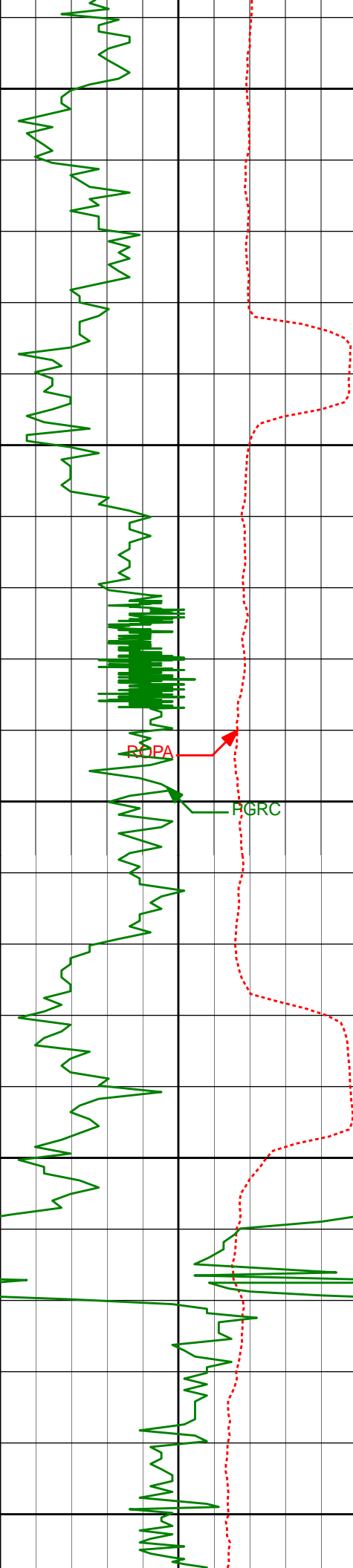
12116'

88.40°

269.17°

6607.16'

5935.81'



12150'

12200'

12250'

12300'

12350'

12211'

88.52°

267.62°

6609.71'

6030.78'

POPA

HGRC

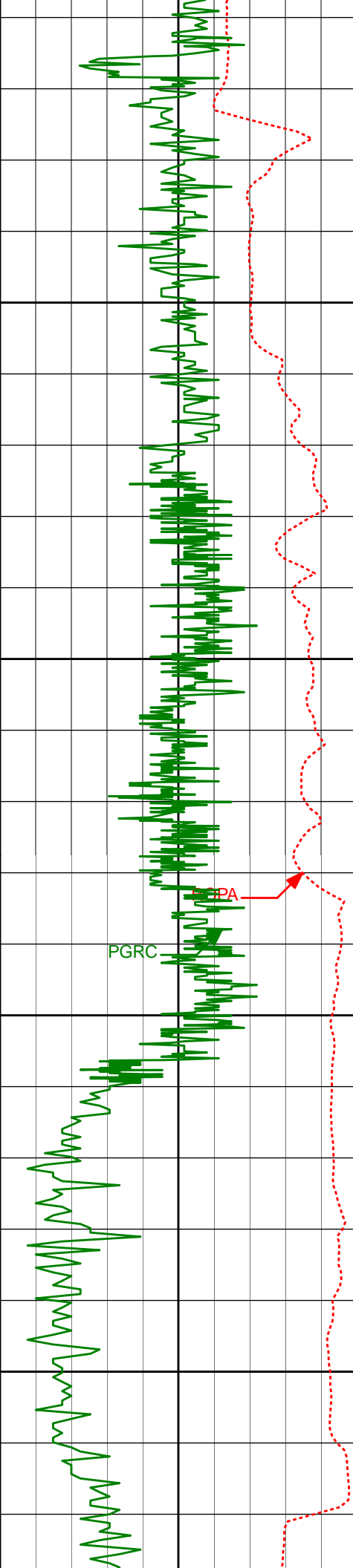
12306'

90.52°

268.28°

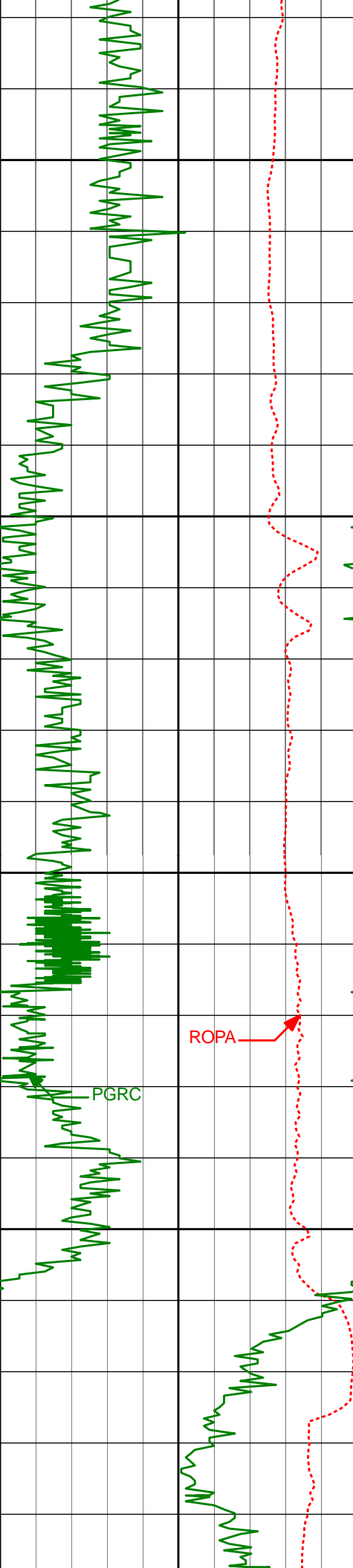
6610.51'

6125.77'

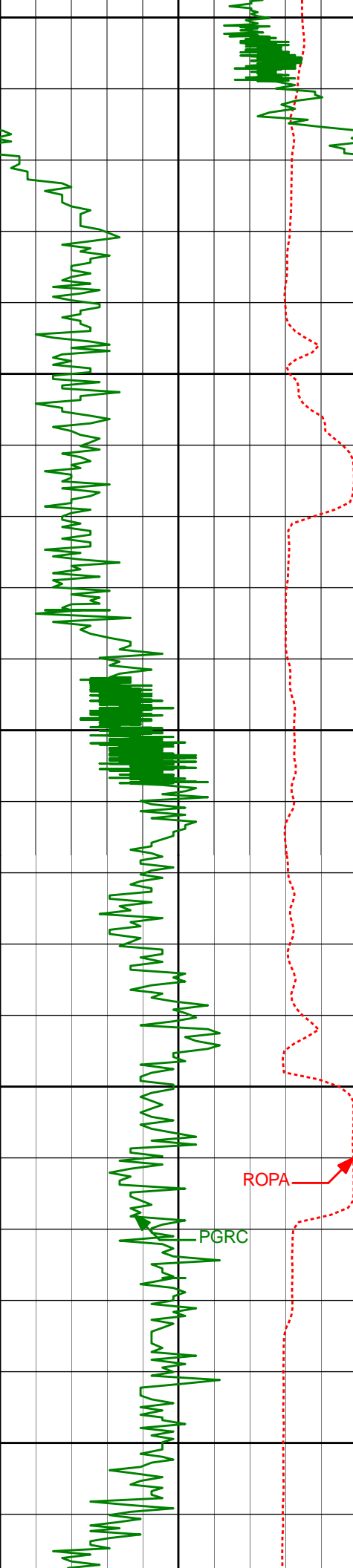


12400'	12401'	90.28°	268.31°	6609.84'	6220.76'
12450'					
12500'	12495'	90.03°	267.90°	6609.59'	6314.76'
12550'					

Run 400



12589'	89.88°	267.51°	6609.66'	6408.76'
12600'				
12650'				
12684'	90.62°	267.01°	6609.25'	6503.74'
12700'				
12750'				
12779'	89.63°	267.99°	6609.04'	6598.73'



12800'

12850'

12900'

12950'

13000'

12874'

89.32°

268.10°

6609.91'

6693.72'

12969'

89.63°

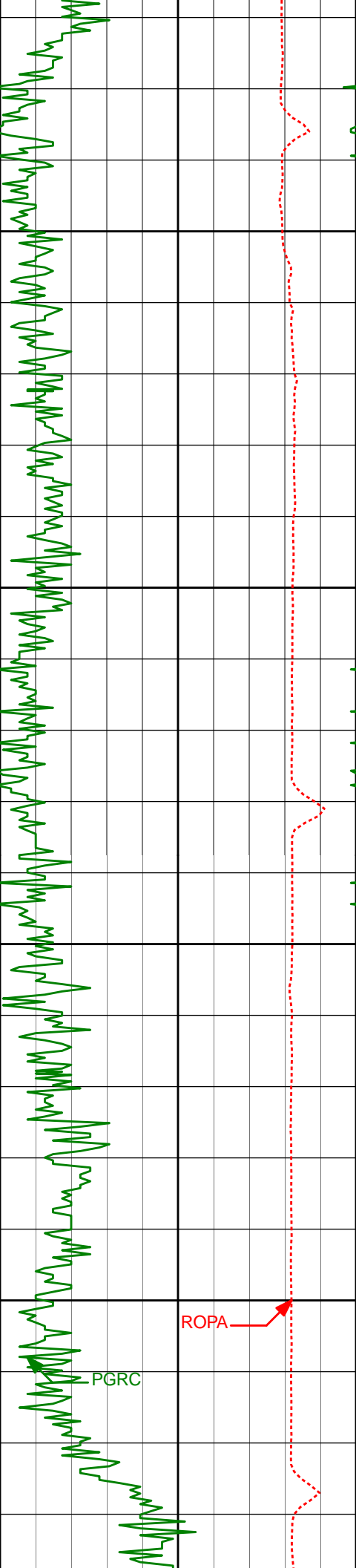
269.68°

6610.78'

6788.71'

ROPA

PGRC



13050'

13064'

89.45°

269.63°

6611.55'

6883.68'

13100'

13150'

13159'

89.29°

269.06°

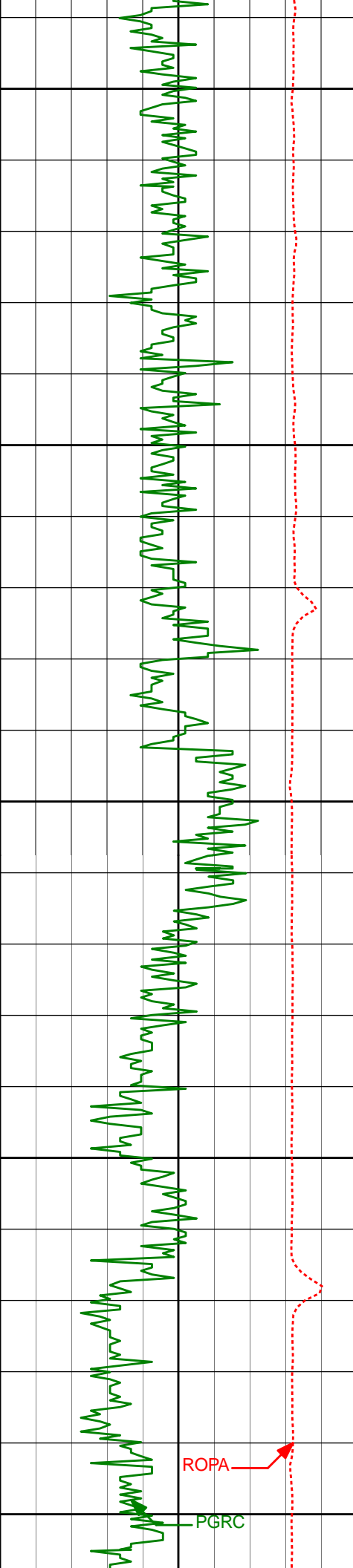
6612.59'

6978.66'

13200'

ROPA

PGRC



13250'

13254'

89.48°

268.87°

6613.61'

7073.65'

13300'

13350'

13349'

90.03°

268.87°

6614.02'

7168.64'

13400'

13450'

13443'

89.97°

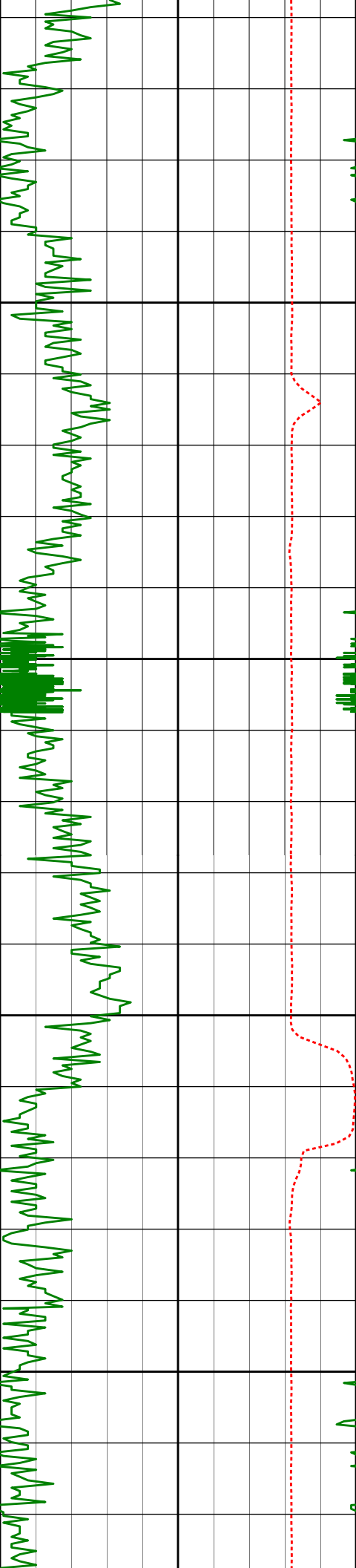
268.10°

6614.02'

7262.64'

ROPA

PGRC



13500'

13538'

90.22°

267.72°

6613.86'

7357.64'

13550'

13600'

13633'

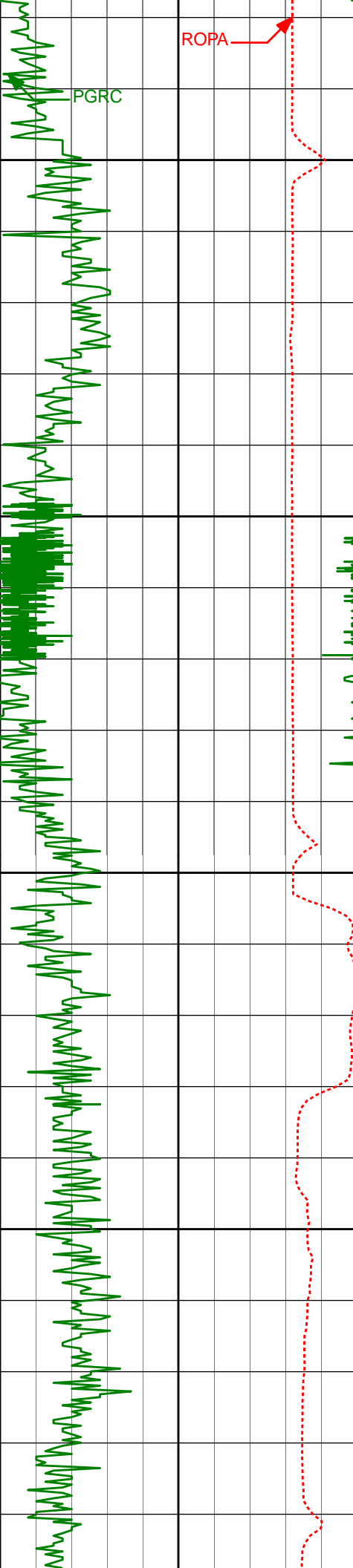
89.88°

268.03°

6613.78'

7452.64'

13650'



ROPA

PGRC

13700'

13728'

89.26°

267.62°

6614.49'

7547.63'

13750'

13800'

13823'

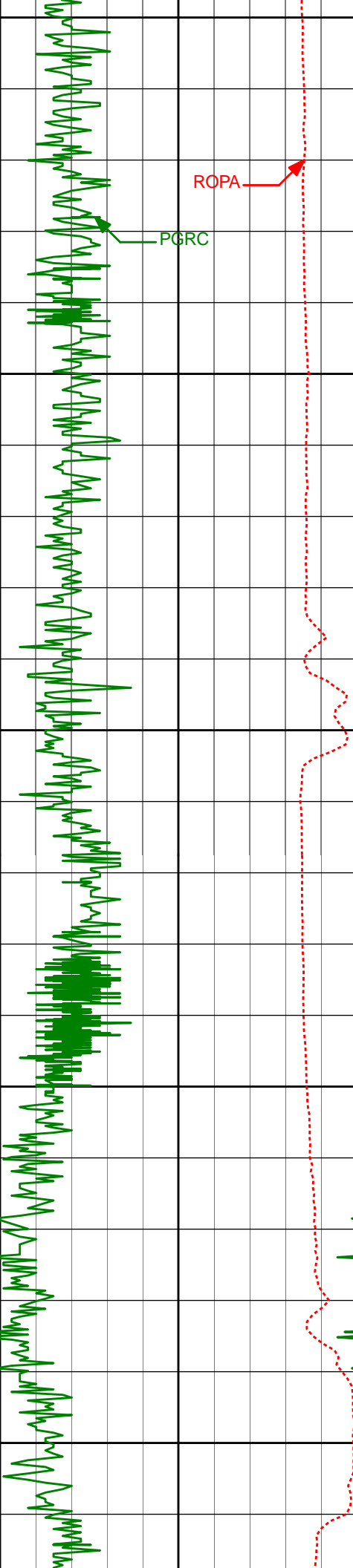
89.05°

268.56°

6615.89'

7642.62'

13850'



13900'

13918'

89.14°

267.42°

6617.39'

7737.60'

13950'

14000'

14012'

88.27°

265.48°

6619.51'

7831.52'

14050'

14100'

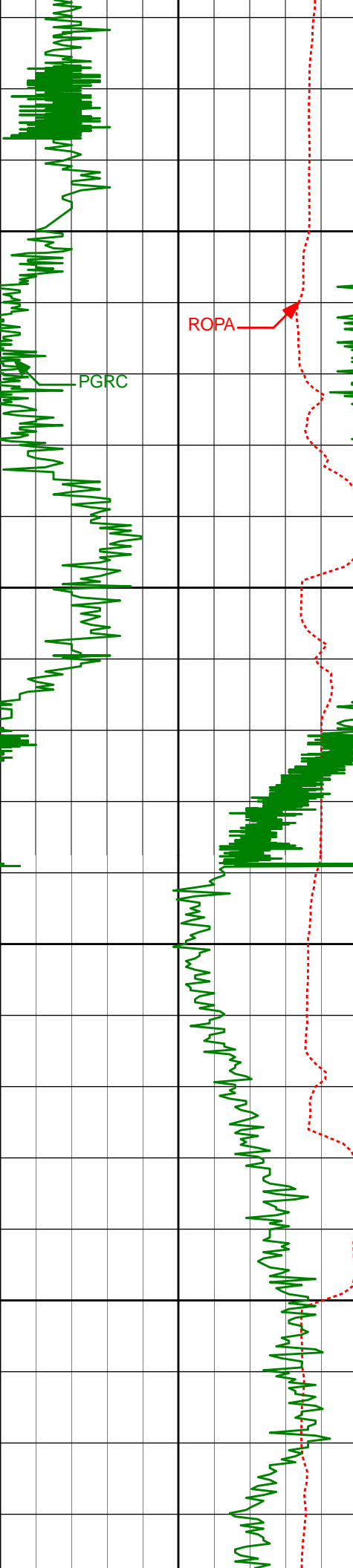
14107'

90.28°

266.60°

6620.73'

7926.43'



14150'

ROPA

PGRC

14200'

14202'

90.86°

267.62°

6619.78'

8021.41'

14250'

14300'

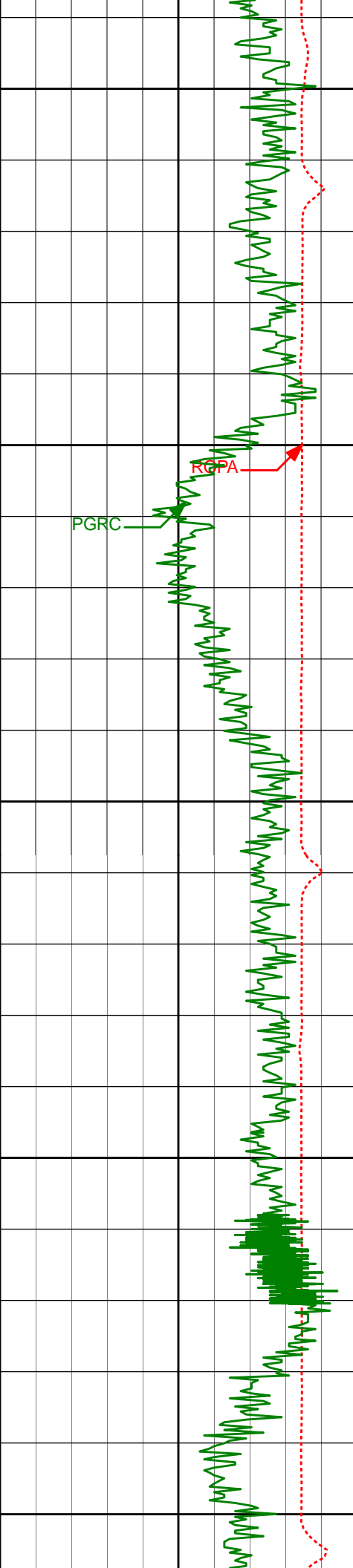
14296'

90.80°

269.63°

6618.42'

8115.39'



14350'

14392'

91.14°

268.59°

6616.80'

8211.37'

14400'

14450'

14487'

91.57°

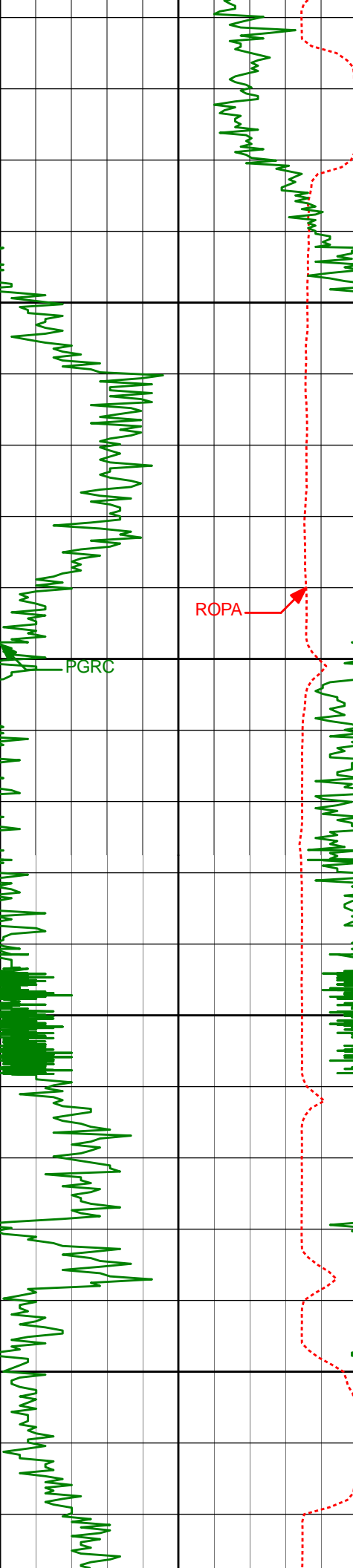
268.49°

6614.55'

8306.34'

14500'

14550'



14582'	91.11°	269.77°	6612.33'	8401.30'
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14600'

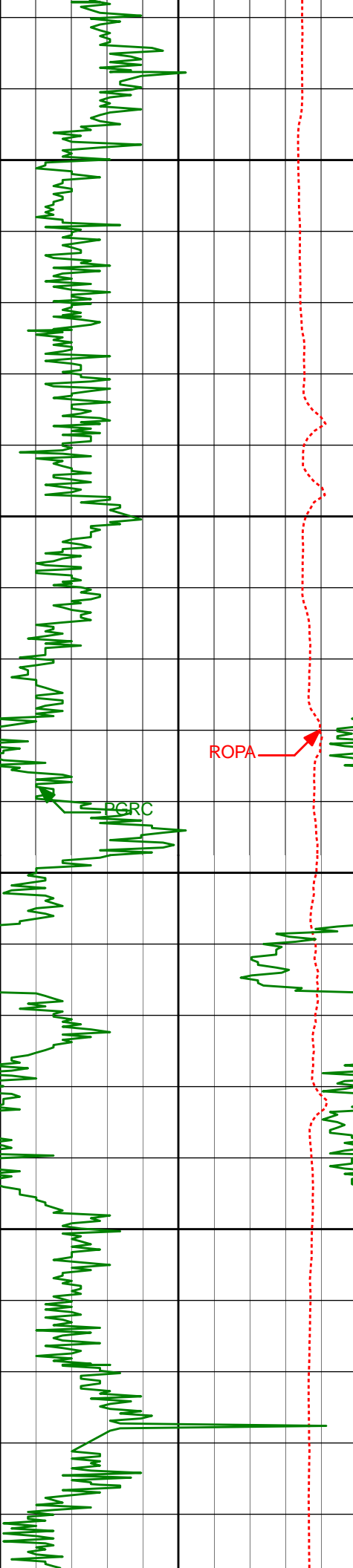
14650'

14676'	91.11°	269.55°	6610.51'	8495.26'
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14700'

14750'

14771'	90.34°	270.86°	6609.31'	8590.19'
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14800'

14850'

14900'

14950'

ROPA

PGRC

14866'

90.59°

270.54°

6608.54'

8685.11'

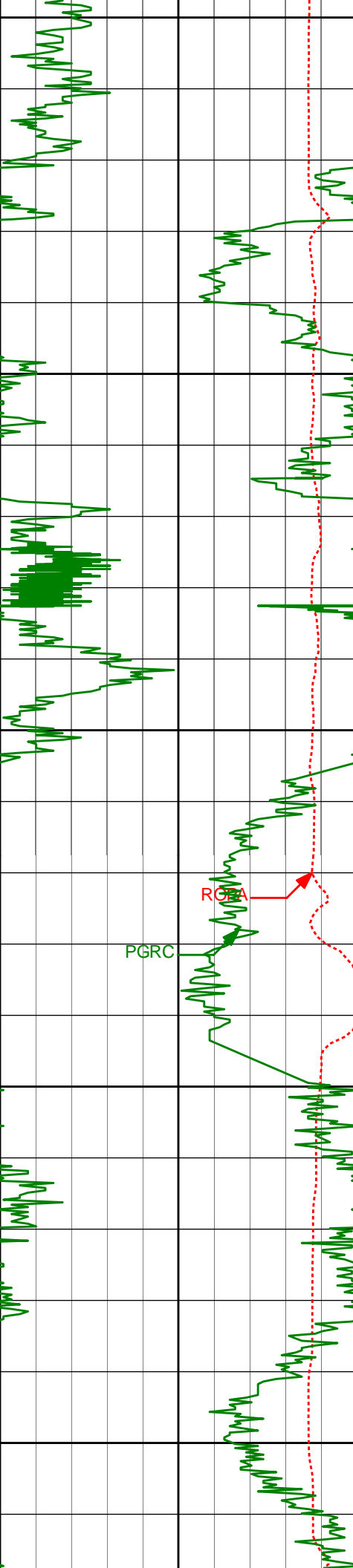
14961'

90.93°

270.01°

6607.28'

8780.04'



15000'

15050'

15100'

15150'

15200'

15056'

91.48°

269.44°

6605.28'

8874.99'

PGRC

RCA

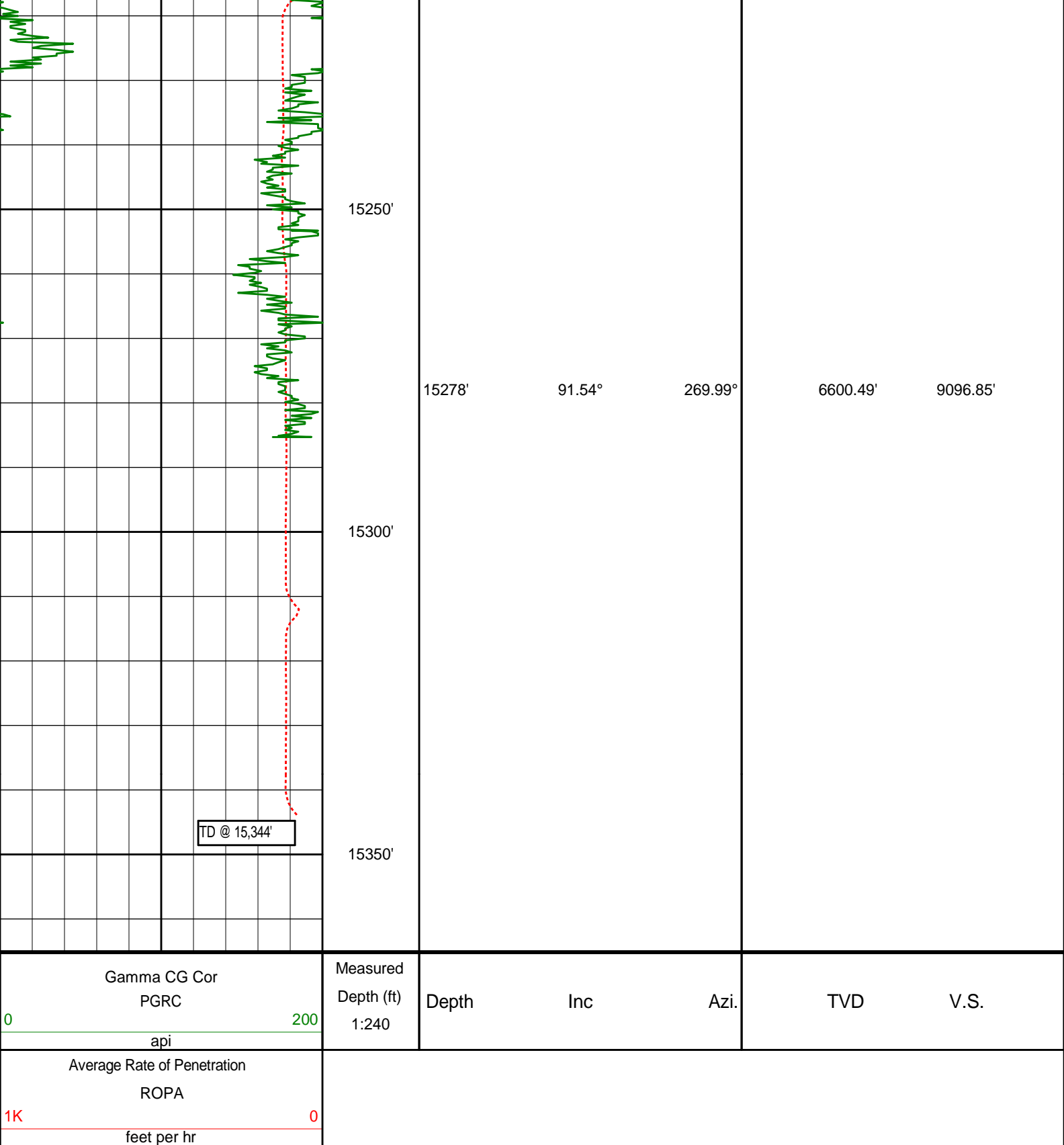
15151'

90.96°

270.17°

6603.26'

8969.94'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch State AE31-69HNC
Wattenberg
Weld Colorado
USA
CA-XX-0901134791

0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
350.00	0.40	225.37	350.00	0.86 S	0.87 W	0.90	0.11
615.00	0.60	109.37	614.99	1.97 S	0.22 W	0.28	0.32
713.00	0.55	156.65	712.99	2.57 S	0.45 E	-0.37	0.47
805.00	0.63	139.58	804.98	3.36 S	0.95 E	-0.85	0.21
898.00	0.72	125.79	897.98	4.09 S	1.76 E	-1.63	0.20
990.00	0.70	137.49	989.97	4.84 S	2.61 E	-2.45	0.16
1083.00	0.84	136.81	1082.96	5.76 S	3.46 E	-3.27	0.15
1177.00	0.72	161.98	1176.95	6.82 S	4.11 E	-3.89	0.38
1270.00	0.60	19.58	1269.95	6.92 S	4.46 E	-4.24	1.34
1455.00	0.68	358.66	1454.94	4.91 S	4.76 E	-4.60	0.13
1550.00	0.50	4.10	1549.93	3.93 S	4.77 E	-4.65	0.20
1645.00	1.56	218.47	1644.92	4.53 S	4.00 E	-3.85	2.10
1739.00	2.58	212.33	1738.86	7.32 S	2.07 E	-1.84	1.11
1834.00	4.71	218.51	1833.66	12.18 S	1.50 W	1.89	2.28
1929.00	6.06	211.85	1928.24	19.49 S	6.58 W	7.19	1.56
2023.00	7.24	215.42	2021.61	28.54 S	12.63 W	13.53	1.33
2118.00	8.32	221.00	2115.73	38.60 S	20.61 W	21.82	1.39
2213.00	8.71	221.09	2209.69	49.21 S	29.84 W	31.39	0.41
2307.00	9.04	230.20	2302.57	59.30 S	40.20 W	42.06	1.53
2402.00	7.91	231.17	2396.53	68.18 S	51.02 W	53.16	1.20
2497.00	7.12	234.93	2490.71	75.66 S	60.93 W	63.31	0.98
2592.00	6.37	233.46	2585.05	82.18 S	69.99 W	72.56	0.81
2686.00	5.69	219.46	2678.54	88.88 S	77.14 W	79.92	1.72
2781.00	4.01	236.42	2773.20	94.36 S	82.90 W	85.85	2.31
2876.00	2.41	250.37	2868.05	96.87 S	87.55 W	90.58	1.86
2971.00	0.47	288.97	2963.01	97.41 S	89.80 W	92.85	2.17
3066.00	0.31	275.03	3058.01	97.26 S	90.42 W	93.47	0.19
3160.00	0.22	346.29	3152.01	97.06 S	90.72 W	93.76	0.34
3255.00	0.33	94.55	3247.01	96.91 S	90.49 W	93.52	0.47
3350.00	0.62	286.43	3342.01	96.78 S	90.71 W	93.74	1.00
3444.00	0.47	225.13	3436.01	96.91 S	91.47 W	94.50	0.61
3539.00	0.56	193.51	3531.00	97.64 S	91.86 W	94.91	0.31
3634.00	0.88	204.21	3626.00	98.76 S	92.26 W	95.35	0.36
3728.00	0.77	204.25	3719.99	99.99 S	92.82 W	95.95	0.12
3823.00	0.62	248.92	3814.98	100.76 S	93.56 W	96.71	0.57
3918.00	0.72	235.34	3909.97	101.28 S	94.53 W	97.70	0.20
4013.00	0.23	213.05	4004.97	101.78 S	95.13 W	98.31	0.54
4108.00	0.17	35.69	4099.97	101.83 S	95.15 W	98.33	0.42
4202.00	0.13	230.84	4193.97	101.78 S	95.15 W	98.33	0.32
4297.00	0.18	179.15	4288.97	102.00 S	95.23 W	98.42	0.15
4392.00	0.10	299.18	4383.97	102.11 S	95.30 W	98.50	0.26
4487.00	0.28	1.97	4478.97	101.83 S	95.37 W	98.55	0.26
4582.00	0.37	308.47	4573.97	101.41 S	95.60 W	98.77	0.32
4677.00	0.63	319.69	4668.96	100.82 S	96.18 W	99.33	0.29
4771.00	0.52	301.11	4762.96	100.21 S	96.87 W	100.01	0.23
4866.00	0.18	322.55	4857.96	99.87 S	97.33 W	100.46	0.38
4961.00	0.13	324.27	4952.96	99.66 S	97.49 W	100.60	0.05
5056.00	0.39	299.86	5047.96	99.41 S	97.83 W	100.94	0.29
5151.00	0.80	243.21	5142.95	99.55 S	98.70 W	101.82	0.71
5246.00	0.80	266.01	5237.94	99.89 S	99.96 W	103.08	0.33
5340.00	0.73	303.62	5331.93	99.61 S	101.11 W	104.22	0.53
5435.00	0.89	265.11	5426.92	99.34 S	102.35 W	105.45	0.58
5530.00	0.81	288.06	5521.91	99.19 S	103.72 W	106.82	0.37
5719.00	0.65	278.80	5710.90	98.61 S	106.05 W	109.13	0.10
5812.00	0.86	275.94	5803.89	98.46 S	107.27 W	110.34	0.23
5907.00	0.89	287.13	5898.88	98.17 S	108.68 W	111.75	0.18
5955.00	3.88	270.20	5946.83	98.05 S	110.66 W	113.72	6.33
6002.00	7.18	265.08	5993.61	98.30 S	115.18 W	118.25	7.09
6050.00	10.67	260.01	6041.02	99.33 S	122.55 W	125.64	7.45
6097.00	13.82	264.42	6086.95	100.63 S	132.42 W	135.55	6.99
6192.00	22.83	268.98	6177.04	102.06 S	162.21 W	165.37	9.60
6287.00	30.17	268.90	6262.00	102.85 S	204.56 W	207.72	7.73
6381.00	40.49	266.19	6338.59	105.34 S	258.78 W	261.99	11.10
6476.00	55.14	265.07	6402.21	110.77 S	328.76 W	332.12	15.45
6571.00	61.81	266.84	6451.86	116.43 S	409.49 W	412.99	7.20
6666.00	66.70	266.16	6493.11	121.67 S	494.88 W	498.49	5.19
6760.00	70.65	269.19	6527.30	125.19 S	582.34 W	586.02	5.16
6808.00	74.33	269.50	6541.74	125.71 S	628.11 W	631.78	7.69
6859.00	81.04	269.55	6552.61	126.12 S	677.90 W	681.57	13.16

6946.00	87.13	270.03	6561.57	126.43 S	764.40 W	768.03	7.02
7040.00	90.99	268.80	6563.11	127.39 S	858.36 W	861.97	4.31
7135.00	89.72	268.11	6562.52	129.96 S	953.32 W	956.97	1.52
7230.00	90.09	270.00	6562.68	131.52 S	1048.30 W	1051.95	2.03
7325.00	88.77	270.16	6563.63	131.39 S	1143.30 W	1146.89	1.40
7420.00	89.72	267.84	6564.88	133.05 S	1238.27 W	1241.87	2.64
7515.00	89.23	266.83	6565.75	137.47 S	1333.16 W	1336.85	1.18
7609.00	89.32	266.50	6566.94	142.93 S	1426.99 W	1430.81	0.36
7704.00	89.11	266.63	6568.24	148.62 S	1521.81 W	1525.76	0.26
7799.00	88.61	268.32	6570.13	152.81 S	1616.70 W	1620.73	1.85
7894.00	91.02	269.59	6570.44	154.54 S	1711.67 W	1715.72	2.87
7989.00	89.04	272.65	6570.39	152.69 S	1806.64 W	1810.58	3.84
8083.00	89.29	270.34	6571.76	150.23 S	1900.59 W	1904.40	2.47
8178.00	88.12	268.67	6573.90	151.05 S	1995.56 W	1999.35	2.15
8272.00	89.57	269.84	6575.80	152.28 S	2089.52 W	2093.31	1.98
8367.00	90.80	269.84	6575.49	152.54 S	2184.52 W	2188.26	1.29
8462.00	88.21	268.47	6576.31	153.94 S	2279.50 W	2283.24	3.08
8556.00	88.92	268.85	6578.67	156.14 S	2373.44 W	2377.20	0.86
8651.00	89.51	268.32	6579.97	158.48 S	2468.40 W	2472.19	0.83
8746.00	89.75	268.59	6580.58	161.05 S	2563.37 W	2567.19	0.38
8841.00	89.48	267.89	6581.22	163.96 S	2658.32 W	2662.19	0.79
8935.00	90.74	268.69	6581.04	166.77 S	2752.27 W	2756.18	1.59
9030.00	89.48	269.02	6580.86	168.67 S	2847.25 W	2851.17	1.37
9125.00	89.63	268.56	6581.59	170.67 S	2942.23 W	2946.17	0.51
9220.00	89.38	266.54	6582.42	174.73 S	3037.13 W	3041.15	2.14
9315.00	90.96	268.32	6582.13	178.99 S	3132.03 W	3136.14	2.51
9410.00	90.71	270.26	6580.75	180.17 S	3227.01 W	3231.10	2.06
9505.00	87.90	269.18	6581.90	180.63 S	3321.99 W	3326.05	3.17
9596.00	88.30	270.01	6584.92	181.28 S	3412.94 W	3416.97	1.01
9688.00	89.14	269.54	6586.97	181.64 S	3504.91 W	3508.91	1.05
9781.00	89.88	269.25	6587.77	182.62 S	3597.90 W	3601.89	0.85
9873.00	88.52	267.11	6589.05	185.54 S	3689.84 W	3693.87	2.76
9966.00	88.43	268.29	6591.53	189.27 S	3782.73 W	3786.83	1.27
10059.00	89.88	268.50	6592.90	191.88 S	3875.68 W	3879.82	1.58
10151.00	90.99	269.31	6592.20	193.64 S	3967.66 W	3971.81	1.49
10243.00	89.91	270.19	6591.48	194.04 S	4059.65 W	4063.77	1.51
10335.00	89.41	268.82	6592.03	194.83 S	4151.65 W	4155.74	1.59
10428.00	89.57	266.66	6592.85	198.50 S	4244.56 W	4248.73	2.33
10521.00	89.54	267.24	6593.58	203.45 S	4337.43 W	4341.70	0.62
10614.00	90.28	268.55	6593.72	206.86 S	4430.36 W	4434.70	1.62
10708.00	88.49	268.97	6594.73	208.90 S	4524.33 W	4528.68	1.96
10801.00	90.37	269.97	6595.66	209.76 S	4617.32 W	4621.65	2.29
10894.00	91.20	270.77	6594.38	209.16 S	4710.31 W	4714.57	1.24
10986.00	89.48	270.54	6593.84	208.11 S	4802.29 W	4806.48	1.89
11078.00	89.78	268.42	6594.43	208.94 S	4894.28 W	4898.45	2.33
11172.00	89.91	266.79	6594.68	212.87 S	4988.20 W	4992.44	1.74
11267.00	89.63	267.65	6595.07	217.48 S	5083.08 W	5087.43	0.95
11361.00	89.57	268.38	6595.72	220.73 S	5177.03 W	5181.42	0.78
11455.00	90.03	268.44	6596.05	223.34 S	5270.99 W	5275.42	0.49
11550.00	89.75	269.20	6596.23	225.30 S	5365.97 W	5370.42	0.85
11644.00	89.41	270.73	6596.92	225.35 S	5459.96 W	5464.36	1.67
11739.00	90.15	270.72	6597.29	224.15 S	5554.95 W	5559.27	0.78
11833.00	89.08	272.27	6597.92	221.70 S	5648.91 W	5653.11	2.00
11927.00	87.84	269.30	6600.44	220.41 S	5742.86 W	5746.96	3.42
12022.00	87.81	269.12	6604.05	221.72 S	5837.78 W	5841.88	0.19
12116.00	88.40	269.05	6607.16	223.22 S	5931.72 W	5935.81	0.63
12211.00	88.52	267.53	6609.71	226.06 S	6026.64 W	6030.78	1.60
12306.00	90.52	268.10	6610.51	229.68 S	6121.56 W	6125.77	2.19
12401.00	90.28	268.13	6609.84	232.80 S	6216.51 W	6220.76	0.25
12495.00	90.03	267.73	6609.59	236.20 S	6310.44 W	6314.76	0.50
12589.00	89.88	267.38	6609.66	240.21 S	6404.36 W	6408.76	0.41
12684.00	90.62	266.87	6609.25	244.97 S	6499.24 W	6503.74	0.95
12779.00	89.63	267.86	6609.04	249.34 S	6594.13 W	6598.73	1.47
12874.00	89.32	267.97	6609.91	252.80 S	6689.07 W	6693.72	0.35
12969.00	89.63	269.54	6610.78	254.86 S	6784.04 W	6788.71	1.68
13064.00	89.45	269.49	6611.55	255.66 S	6879.03 W	6883.68	0.20
13159.00	89.29	268.93	6612.59	256.97 S	6974.02 W	6978.66	0.61
13254.00	89.48	268.73	6613.61	258.91 S	7068.99 W	7073.65	0.29
13349.00	90.03	268.74	6614.02	261.01 S	7163.97 W	7168.64	0.58
13443.00	89.97	267.96	6614.02	263.72 S	7257.93 W	7262.64	0.83
13538.00	90.22	267.58	6613.86	267.41 S	7352.85 W	7357.64	0.48
13633.00	89.88	267.90	6613.78	271.16 S	7447.78 W	7452.64	0.49
13728.00	89.26	267.49	6614.49	274.98 S	7542.70 W	7547.63	0.78
13823.00	89.05	268.43	6615.89	278.36 S	7637.63 W	7642.62	1.01
13918.00	89.14	267.29	6617.39	281.91 S	7732.55 W	7737.60	1.20

14013.00	88.27	265.34	6619.54	288.01 S	7827.32 W	7832.52	2.25
14107.00	90.28	266.47	6620.73	294.72 S	7921.07 W	7926.43	2.45
14202.00	90.86	267.48	6619.78	299.74 S	8015.93 W	8021.41	1.23
14297.00	90.80	269.50	6618.41	302.24 S	8110.88 W	8116.39	2.13
14392.00	91.14	268.46	6616.80	303.93 S	8205.85 W	8211.37	1.15
14487.00	91.57	268.35	6614.55	306.58 S	8300.79 W	8306.34	0.47
14582.00	91.11	269.64	6612.33	308.24 S	8395.75 W	8401.30	1.44
14676.00	91.11	269.41	6610.51	309.02 S	8489.72 W	8495.26	0.24
14771.00	90.34	270.73	6609.31	308.90 S	8584.71 W	8590.19	1.61
14866.00	90.59	270.41	6608.54	307.96 S	8679.71 W	8685.11	0.43
14961.00	90.93	269.88	6607.28	307.72 S	8774.70 W	8780.04	0.66
15056.00	91.48	269.31	6605.28	308.39 S	8869.67 W	8874.99	0.83
15151.00	90.96	270.03	6603.26	308.94 S	8964.65 W	8969.94	0.93
15278.00	91.54	269.86	6600.49	309.06 S	9091.62 W	9096.85	0.48
15344.00	91.54	269.86	6598.71	309.22 S	9157.59 W	9162.79	0.00

CALCULATION BASED ON MINIMUM CURVATURE METHOD

**SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT**

**VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 268.18 DEGREES (GRID)
A TOTAL CORRECTION OF 7.57 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 15344.00 FEET
IS 9162.81 FEET ALONG 268.07 DEGREES (GRID)**

**The first two surveys at 350' and 615' are provided by HP.
Final survey is a straight line projection to TD.**